PB83-152512

Environmental Radiation Data
Report 27 (July-September 1981)

(U.S.) Eastern Environmental Radiation Facility
Montgomery, AL

Dec 81

U.S. Department of Commerce
National Technical Information Service
NTIS

United States
Environmental Protection
Agency

Office of
Radiation Programs
Washington DC 20460

EPA 520/5-82-016
December 1981

Radiation

PB83-152512

EPA

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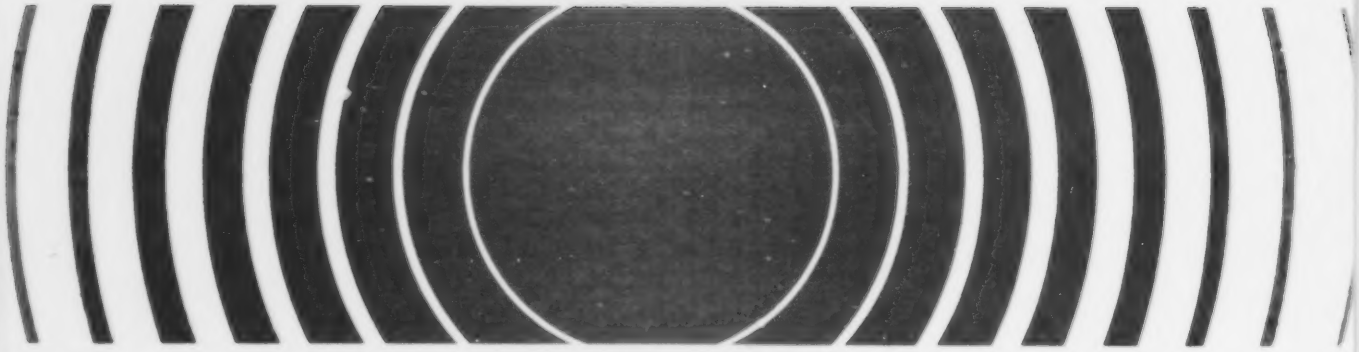

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(Please read Instructions on the reverse before completing)

1. REPORT NO. EPA 520/5-82-016	2.
3. RECIPIENT'S ACCESSION NO. PB83 152512	
4. TITLE AND SUBTITLE Environmental Radiation Data: Report 27 (July - September 1981)	5. REPORT DATE December 1981
	6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) Eastern Environmental Radiation Facility(EERF)	8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS Eastern Environmental Radiation Facility P. O. Box 3009 Montgomery, Alabama 36193	10. PROGRAM ELEMENT NO.
	11. CONTRACT/GRANT NO.
12. SPONSORING AGENCY NAME AND ADDRESS U. S. Environmental Protection Agency Office of Radiation Programs 401 M Street, S.W. Washington, D.C. 20460	13. TYPE OF REPORT AND PERIOD COVERED In-house(July-September 1981)
	14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

16. ABSTRACT

Environmental Radiation Data(ERD) is compiled and published quarterly(five months after the quarter being monitored). The report includes data from the Environmental Radiation Ambient Monitoring System(ERAMS) and similar networks operated by contributing states. The ERAMS monitors environmental media for radioactive contaminants in air, precipitation, surface water, drinking water, and milk samples collected by state and local agencies throughout the United States. Specific radiochemical analyses include gross alpha, gross beta, gamma, tritium, ^{14}C, ^{85}Kr, ^{131}I, $^{89\text{-}90}Sr$, ^{226}Ra, $^{238\text{-}239}Pu$, and $^{234\text{-}235\text{-}238}U$. All data and associated 2 sigma counting errors are reported in standard units. Precision and accuracy of the date are ensured by duplicate analyses and participation in internal and external quality assurance programs.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group

18. DISTRIBUTION STATEMENT Available from NTIS	19. SECURITY CLASS (This Report) unclassified	21. NO. OF PAGES 74
	20. SECURITY CLASS (This page) unclassified	22. PRICE

EPA Form 2220-1 (Rev. 4-77) PREVIOUS EDITION IS OBSOLETE

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EPA 520/5-82-016

E N V I R O N M E N T A L

R A D I A T I O N

D A T A

REPORT 27

December 1981

Office of Radiation Program

U.S. ENVIRONMENTAL PROTECTION AGENCY

II

Preface

Environmental Radiation Data (ERD) is compiled and distributed quarterly by the Office of Radiation Programs' Eastern Environmental Radiation Facility (EERF), Montgomery, Alabama. Data from the Environmental Radiation Ambient Monitoring System (ERAMS), and similar networks operated by contributing States, Canada, Mexico, and the Pan American Health Organization are reported in (ERD).

ERAMS was established in 1973 by the U. S. Environmental Protection Agency's Office of Radiation Programs (ORP). The ERAMS is comprised of nationwide sampling stations that provide air, surface, and drinking water and milk samples from which environmental radiation levels are derived. The major emphasis for ERAMS is toward identifying trends in the accumulation of long-lived radionuclides in the environment.

Sampling locations are selected to provide the best possible combination of radiation source monitoring (such as surface water downstream from a nuclear power reactor) and wide population coverage.

The radiation analyses performed on these samples include gross alpha and gross beta levels, as well as specific analyses for uranium fuel cycle related radionuclides. The latter category includes but is not limited to uranium, plutonium, iodine, and krypton, which are released into the environment from stationary sources such as nuclear power reactors, fuel fabrication and reprocessing plants.

ENVIRONMENTAL RADIATION

DATA

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DATA • Reporting Rationale and Procedures

The intent of EPA's Office of Radiation Programs in establishing the Environmental Radiation Ambient Monitoring System was to provide continuous, accurate and usable environmental radiation data for the public. Therefore, new data reporting procedures were developed to allow better interpretation of the data. The most significant change in this reporting procedure is that all specific radionuclide analyses will be reported as the counting results indicate, whether the number is negative, zero, or positive.

Reporting Rationale

Frequently, concentrations of a radionuclide in environmental media are close to zero. When the actual concentration of a nuclide is zero, the net counting results should statistically show a distribution of negative and positive numbers about zero. This occurs when the background count is subtracted from a sample which has only background activity. Prior to July 1975, ERAMS data were not reported numerically when the results were less than a specified reporting level or minimum detectable level. The present reporting procedure allows all the data to be reported and evaluated statistically without an arbitrary cutoff of small or negative numbers. This approach will facilitate estimates of bias in the nuclide analyses and will allow better evaluation of distributions and trends in environmental data.

When reviewing the data in this report, caution should be exercised in the interpretation of individual negative values. Obviously, a negative activity value does not have physical significance. Such numbers, however, are significant when taken together with other observations which indicate that the true value of a distribution is near zero. When an average of several measurements produces a result less than zero, this indicates a negative bias in the measurement procedure.

(1) Reported Values

Specific Analyses - All specific radionuclide analyses will be reported as the counting results indicate, whether the number is negative, zero, or positive. Numerical values given are as of sample collection date.

Gross Analyses - The actual value of gross radioactivity measurements will be reported, unless the value is below the minimum detectable level (MDL) at the 2 sigma confidence level, then < minimum detectable level will be reported.

MDL is defined as the 3 sigma error of the background. A tabulation of MDL's is given in the following table.

(2) Reported Error Terms

Each reported value for specific analyses will be accompanied by a counting error term at the 2 sigma (95%) confidence interval. Potassium concentrations are determined by specific activity analyses. Error terms are therefore reported as counting errors. At the very low levels characteristic of most ERAMS measurements, counting error is the greatest contributor to overall error.

(3) Significant Figures

All reported values will be rounded to no more than three significant figures. The last significant figure will be increased by one if the figure following is five or greater, otherwise it is left unchanged.

(4) Reporting Levels

The reporting units, smallest increments for reporting, and minimum detectable levels for each isotope are shown in table 1. Smallest increments are sometimes considerably smaller than minimum detectable amounts to avoid truncation errors in averaging.

(5) Averages

Averages will be calculated along with appropriate error terms in an annual summary and analysis of ERAMS data. In calculating these averages, all values of individual data including negative numbers will be utilized. Averages will not be included in ERD quarterly reports.

TABLE 1

ERAMS Reporting Increments and Minimum Detectable Levels

for Radionuclide Analyses

Radionuclide	Media	Reporting Units	Reporting Increments	Minimum Detectable Levels
Gross alpha	Water	pCi/l	1 pCi/l	2 pCi/l
Gross beta	Air	pCi/m^3	.01 pCi/m^3	.01 pCi/m^3
	Water	pCi/l	1 pCi/l	1 pCi/l
	Precipitation	nCi/m^2	.01 nCi/m^2	.01 nCi/m^2(a)
Tritium	Water	nCi/l	.1 nCi/l	.2 nCi/l
	Milk	nCi/l	.1 nCi/l	.2 nCi/l
Carbon-14	Milk	pCi/l	1 pCi/l	15 pCi/l
Krypton-85	Ambient Air	pCi/m^3	.1 pCi/m^3	2 pCi/m^3
Plutonium-238, 239	Air	aCi/m^3	.1 aCi/m^3	.015 pCi(b) per sample
	Milk	pCi/l	.001 pCi/l	.015 pCi per sample
	Water	pCi/l	.001 pCi/l	.015 pCi per sample
Uranium-234, 235,238	Air	aCi/m^3	.1 aCi/m^3	.015 pCi(b) per sample
	Milk	pCi/l	.001 pCi/l	.015 pCi per sample
	Water	pCi/l	.001 pCi/l	.015 pCi per sample
Radium-226	Water	pCi/l	.1 pCi/l	.1 pCi/l
Strontium-90	Milk	pCi/l	.1 pCi/l	1 pCi/l
	Water	pCi/l	.1 pCi/l	1 pCi/l

Radionuclide	Media	Reporting Units	Reporting Increments	Minimum Detectable Levels
Strontium-89	Milk	pCi/l	1 pCi/l	5 pCi/l[(c)]
Iodine-131	Milk	pCi/l	1 pCi/l	10 pCi/l[(c)]
	Water	pCi/l	1 pCi/l	10 pCi/l[(c)]
	Water (specific radiochemical analysis)	pCi/l	.1 pCi/l	.4 pCi/l
Iodine-129	Milk	fCi/l	.1 fCi/l	.4 fCi/l
Iodine-127	Milk	g/l	10 g/l	10 g/l
Cesium-137	Milk	pCi/l	1 pCi/l	10 pCi/l
	Water	pCi/l	1 pCi/l	10 pCi/l
Barium-140	Milk	pCi/l	1 pCi/l	10 pCi/l[(c)]
	Water	pCi/l	1 pCi/l	10 pCi/l[(c)]
Potassium	Milk	g/l	.1 g/l	.12 g/l
	Water	g/l	.1 g/l	.12 g/l
Potassium-40	Water	pCi/l	1 pCi/l	100 pCi/l

(a) The value in terms of nCi/m^2 would be dependent on precipitation (mm).
(b) This value in terms of pCi/m^3 would be dependent on the air volume.
(c) Activity as of the day of counting.

ENVIRONMENTAL RADIATION AMBIENT MONITORING SYSTEM (ERAMS)

SECTION I. Air Program

Airborne Particulates and Precipitation

Gross beta radioactivity measurements and certain specific analyses are performed on air particulates and precipitation samples as indicator measurements in assessing the general (national) impact of all contributing sources on environmental levels of radiation.

Airborne particulates are collected continuously at 67 field stations representing wide geographic coverage, including present and potential sources of environmental radioactivity. Sampling sites are located throughout the United States, Virgin Islands, and the Panama Canal.

Filters (10-cm charcoal impregnated cellulose) from air samplers are changed twice weekly and field measurements are made with a G-M survey meter at 5 hours and 29 hours after collection to allow for radon and thoron daughter product decay. Field estimates are reported to appropriate EPA officials by telephone or mail depending on the activity levels found.

The filters are sent to EERF for more sensitive analyses in a low background beta counter. Gamma scans are performed on all filters showing laboratory gross beta counts greater than 1 pCi/m^3. The lower gross beta values reported for laboratory measurements are largely due to the decay of radionuclides which occurred between the times of the field estimates and laboratory measurements.

Precipitation samples are collected at the 22 field stations where air filters are collected. These samples are also sent to EERF where they are composited monthly for tritium, gross beta activity measurements and gamma scans.

These locations also correspond to airborne particulate and drinking water sampling locations selected for plutonium analyses. Plutonium-238, -239, and uranium-234, -235, and -238 analyses are performed annually on precipitation samples collected during March - May.

Tables 2 - 4 present the monthly average gross beta concentrations in airborne particulates for July - September 1981.

Tables 5 - 7 present the monthly average gross beta concentration and any specific gamma concentrations for precipitation samples for July - September 1981. A compilation of individual measurements is available from the EPA, EERF, Montgomery, AL 36193.

The tritium in precipitation samples for July - September 1981 at the selected stations are shown in Table 8.

TABLE 2

AIRBOPNE PARTICULATES
GROSS BETA CONCENTRATION
JULY 1981

LOCATION	# SAM	AIRBORNE PARTICULATES 5-HR FIELD ESTIMATE MAX	MIN	AVG	EERF LAB MEASUREMENT MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	9	1.4	0.2	0.7	0.14	0.01	0.05
CA:BERKELEY	9	0.1	<0.1	<0.1	0.06	0.01	0.04
CA:LOS ANGELES	9	0.9	0.2	0.5	0.08	0.05	0.06
CT:HARTFORD	9	0.4	0.1	0.3	0.10	0.04	0.07
FL:JACKSONVILLE	7	0.3	0.1	0.2	0.12	0.02	0.06
FL:MIAMI	6	0.1	<0.1	0.1	0.10	<0.01	0.03
ID:BOISE	9	0.6	0.3	0.5	0.14	0.07	0.10
ID:IDAHO FALLS	9	NM	NM	NM	0.15	0.07	0.10
IL:CHICAGO	7	0.4	0.1	0.2	0.09	0.04	0.07
IN:INDIANAPOLIS	9	0.8	0.2	0.5	0.11	0.04	0.07
KS:TOPEKA	6	2.8	0.9	1.3	0.02	0.01	0.01
ME:AUGUSTA	9	0.5	0.1	0.2	0.10	0.03	0.07
MI:LANSING	9	0.5	0.2	0.3	0.13	0.04	0.08
MN:MINNEAPOLIS	9	1.3	0.1	0.5	0.16	0.06	0.09
MS:JACKSON	9	0.7	0.2	0.5	0.08	0.02	0.04
MT:HELENA	7	0.6	0.2	0.4	0.13	0.01	0.08
NC:CHARLOTTE	9	0.4	0.1	0.2	0.08	0.03	0.05
ND:BISMARCK	7	0.8	0.2	0.4	0.12	0.03	0.07
NJ:TRENTON	9	1.4	0.2	0.7	0.13	0.06	0.09
NM:SANTA FE	8	0.6	0.2	0.4	0.06	0.01	0.03
NV:LAS VEGAS	9	1.0	0.4	0.7	0.06	0.03	0.05
NY:ALBANY	10	0.7	0.1	0.3	0.15	0.05	0.10
NY:NEW YORK CITY	9	0.3	0.2	0.2	0.14	0.06	0.09
NY:NIAGARA FALLS	8	0.5	0.1	0.3	0.13	0.07	0.09
NY:YAPHANK	8	0.2	<0.1	0.1	0.11	0.05	0.07
OH:COLUMBUS	9	1.2	0.2	0.6	0.15	0.04	0.09
OH:PAINESVILLE	6	0.9	0.4	0.5	0.11	0.07	0.08
OH:TOLEDO	9	1.0	0.3	0.7	0.13	0.05	0.08
OK:OKLAHOMA CITY	19	3.1	0.2	1.5	0.06	0.02	0.04
OR:PORTLAND	9	0.1	<0.1	<0.1	0.09	0.01	0.03
PA:HARRISBURG	13	1.5	0.3	0.7	0.14	0.05	0.09
PA:PITTSBURGH	9	0.7	0.2	0.4	0.18	0.04	0.08
RI:PROVIDENCE	9	0.4	0.1	0.3	0.13	0.04	0.08
SC:BARNWELL	3	0.1	<0.1	0.1	0.02	<0.01	0.01
SC:COLUMBIA	9	1.8	0.3	0.6	0.08	0.03	0.06
TN:KNOXVILLE	6	1.9	0.1	0.6	0.09	0.04	0.06
VA:LYNCHBURG	9	0.9	0.2	0.6	0.12	0.02	0.07
VA:VIRGINIA BEACH	1	0.1	0.1	0.1	0.04	0.02	0.04
WA:SEATTLE	7	0.1	<0.1	0.1	0.06	0.01	0.03
WA:SPOKANE	9	0.5	0.2	0.3	0.11	0.04	0.07
WI:MADISON	6	0.4	0.2	0.3	0.10	0.05	0.07
WV:CHARLESTON	8	0.9	0.2	0.4	0.11	0.02	0.07

MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES - .1 pCi/m^3
MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT - .01 pCi/m^3

NM NO MEASUREMENT

TABLE 3

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
AUGUST 1981

LOCATION	# SAM	AIRBORNE PARTICULATES 5-HR FIELD ESTIMATE MAX	MIN	AVG	EERF LAB MEASUREMENT MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	8	0.9	0.3	0.6	0.03	0.01	0.02
CA:BERKELEY	8	0.1	<0.1	0.1	0.03	<0.01	0.01
CA:LOS ANGELES	8	1.3	0.2	0.5	0.11	0.03	0.04
CT:HARTFORD	9	0.4	0.2	0.3	0.05	0.02	0.04
FL:JACKSONVILLE	9	0.3	<0.1	0.1	0.03	0.01	0.02
FL:MIAMI	9	0.2	<0.1	0.1	0.03	<0.01	0.02
ID:BOISE	9	0.6	0.4	0.5	0.07	0.03	0.05
ID:IDAHO FALLS	9	NM	NM	NM	0.11	0.02	0.05
IL:CHICAGO	6	0.5	<0.1	0.2	0.05	0.03	0.04
IN:INDIANAPOLIS	8	0.8	<0.1	0.4	0.12	0.01	0.05
KS:TOPEKA	9	4.1	0.4	1.4	0.03	0.01	0.02
ME:AUGUSTA	9	0.5	0.1	0.3	0.06	0.01	0.03
MI:LANSING	9	0.5	0.1	0.2	0.07	0.02	0.04
MN:MINNEAPOLIS	8	0.6	0.1	0.3	0.05	0.03	0.04
MS:JACKSON	9	1.2	0.2	0.6	0.07	0.01	0.03
MT:HELENA	7	1.7	0.5	0.8	0.06	0.03	0.05
NC:CHARLOTTE	7	0.2	0.1	0.1	0.05	0.02	0.03
ND:BISMARCK	8	1.5	0.2	0.8	0.05	0.03	0.04
NJ:TRENTON	9	1.4	0.2	0.7	0.06	0.03	0.04
NM:SANTA FE	6	0.7	0.4	0.6	0.03	0.02	0.02
NV:LAS VEGAS	9	1.2	0.5	0.7	0.05	0.02	0.03
NY:ALBANY	6	0.7	0.1	0.4	0.07	0.03	0.04
NY:NEW YORK CITY	8	0.3	0.1	0.2	0.06	0.02	0.04
NY:NIAGARA FALLS	8	0.6	0.1	0.3	0.08	0.04	0.05
NY:YAPHANK	7	0.3	<0.1	0.1	0.05	0.03	0.04
OH:COLUMBUS	9	1.5	0.4	0.8	0.09	0.01	0.05
OH:PAINESVILLE	5	0.6	0.2	0.4	0.07	0.02	0.04
OH:TOLEDO	8	1.2	0.2	0.5	0.05	0.02	0.04
OK:OKLAHOMA CITY	17	3.0	0.4	1.6	0.09	0.01	0.04
OR:PORTLAND	8	0.1	<0.1	<0.1	0.06	0.01	0.03
PA:HARRISBURG	13	1.6	0.2	0.9	0.06	0.03	0.04
PA:PITTSBURGH	9	0.8	0.3	0.5	0.07	0.03	0.04
RI:PROVIDENCE	8	0.4	0.1	0.2	0.06	0.02	0.04
SC:BARNWELL	1	0.3	0.1	0.1	0.03	0.01	0.01
SC:COLUMBIA	8	1.1	0.1	0.5	0.07	0.01	0.03
TN:KNOXVILLE	4	0.4	0.3	0.3	0.05	0.03	0.04
VA:LYNCHBURG	9	0.8	0.1	0.5	0.06	0.03	0.04
VA:VIRGINIA BEACH	5	0.2	0.1	0.1	0.04	0.02	0.03
WA:SEATTLE	8	0.1	<0.1	0.1	0.05	0.01	0.03
WA:SPOKANE	9	0.6	0.3	0.4	0.06	0.03	0.05
WI:MADISON	9	1.1	0.1	0.4	0.06	0.02	0.04
WV:CHARLESTON	8	1.0	0.3	0.7	0.06	0.02	0.04

MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES - .1 pCi/m^3
MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT - .01 pCi/m^3

NM NO MEASUREMENT

TABLE 4

AIRBORNE PARTICULATES
GROSS BETA CONCENTRATION
SEPTEMBER 1981

LOCATION	# SAM	AIRBORNE PARTICULATES 5-HR FIELD ESTIMATE MAX	MIN	AVG	EERF LAB MEASUREMENT MAX	MIN	AVG
		(pCi/m^3)			(pCi/m^3)		
AL:MONTGOMERY	9	1.2	0.2	0.7	0.03	0.01	0.02
CA:BERKELEY	9	0.1	<0.1	0.1	0.03	0.01	0.01
CA:LOS ANGELES	9	0.9	0.3	0.4	0.04	0.01	0.02
CT:HARTFORD	8	0.4	0.1	0.2	0.03	0.01	0.02
FL:JACKSONVILLE	7	0.3	0.1	0.2	0.03	0.02	0.03
FL:MIAMI	8	0.7	<0.1	0.2	0.01	0.01	0.01
ID:BOISE	9	0.9	0.2	0.5	0.03	0.02	0.03
ID:IDAHO FALLS	8	NM	NM	NM	0.07	0.03	0.04
IL:CHICAGO	8	0.7	0.1	0.3	0.03	0.01	0.02
IN:INDIANAPOLIS	9	0.7	0.1	0.3	0.03	0.01	0.02
KS:TOPEKA	8	1.4	0.3	0.8	0.02	0.01	0.01
ME:AUGUSTA	8	0.5	0.1	0.3	0.04	0.01	0.02
MI:LANSING	8	0.4	<0.1	0.2	0.03	0.01	0.01
MN:MINNEAPOLIS	9	0.7	0.1	0.3	0.04	0.01	0.03
MO:JEFFERSON CITY	4	0.9	0.3	0.6	0.02	<0.01	0.01
MS:JACKSON	8	0.8	0.2	0.5	0.07	0.01	0.03
MT:HELENA	9	1.0	0.2	0.5	0.04	0.01	0.03
NC:CHARLOTTE	3	0.4	<0.1	0.2	0.03	0.02	0.03
ND:BISMARCK	9	1.0	0.4	0.7	0.03	0.01	0.02
NJ:TRENTON	7	0.5	0.2	0.3	0.05	0.01	0.02
NV:LAS VEGAS	8	1.3	0.5	0.8	0.03	0.02	0.03
NY:ALBANY	7	0.6	0.1	0.2	0.04	0.01	0.02
NY:NEW YORK CITY	10	0.2	0.1	0.1	0.04	0.01	0.03
NY:NIAGARA FALLS	8	0.2	0.1	0.1	0.04	0.01	0.02
NY:YAPHANK	9	0.2	<0.1	0.1	0.04	0.01	0.03
OH:COLUMBUS	8	1.5	0.2	0.7	0.04	0.02	0.03
OH:PAINESVILLE	6	0.3	0.1	0.2	0.03	0.01	0.02
OH:TOLEDO	8	0.5	0.1	0.2	0.03	0.01	0.02
OK:OKLAHOMA CITY	15	3.6	0.6	2.0	0.04	0.02	0.03
OR:PORTLAND	9	NM	NM	NM	0.03	0.01	0.01
PA:HARRISBURG	11	1.1	0.1	0.5	0.03	0.01	0.02
PA:PITTSBURGH	7	0.6	0.1	0.3	0.02	0.01	0.02
RI:PROVIDENCE	7	0.3	0.1	0.2	0.04	0.01	0.03
SC:BARNWELL	2	NM	NM	NM	<0.01	<0.01	<0.01
SC:COLUMBIA	9	1.8	0.3	0.9	0.08	0.02	0.04
TN:KNOXVILLE	4	0.7	0.3	0.5	0.04	0.02	0.03
VA:LYNCHBURG	8	1.1	<0.1	0.3	0.03	0.02	0.03
VA:VIRGINIA BEACH	7	0.1	0.1	0.1	0.04	0.02	0.02
WA:SEATTLE	9	0.1	<0.1	0.1	0.03	0.01	0.01
WA:SPOKANE	8	0.8	0.2	0.5	0.03	0.01	0.02
WI:MADISON	7	0.3	<0.1	0.1	0.03	<0.01	0.02
WV:CHARLESTON	7	1.7	0.3	0.9	0.03	0.02	0.02

MINIMUM DETECTABLE LIMIT FOR FIELD ESTIMATES - .1 pCi/m^3
MINIMUM DETECTABLE LIMIT FOR LAB MEASUREMENT - .01 pCi/m^3

NM NO MEASUREMENT

TABLE 5

GROSS BETA CONCENTRATION IN PRECIPITATION

JULY 1981

LOCATION	DEPTH (mm)	ACT. ± e (nCi/m^2)		SPECIFIC GAMMA ACT. (pCi/l)
AL:MONTGOMERY	40.0	0.18	0.03	ND
CO:DENVER	8.0	0.10	0.01	ND
CT:HARTFORD	48.8	0.99	0.07	ND
FL:JACKSONVILLE	131.9	0.50	0.09	ND
FL:MIAMI	38.8	0.04	0.02	ND
ID:BOISE	7.5	0.33	0.01	ND
IL:CHICAGO	144.0	0.38	0.09	ND
MI:LANSING	23.5	0.11	0.02	ND
MT:HELENA	20.0	0.28	0.02	ND
ND:BISMARCK	111.1	0.97	0.10	ND
NJ:TRENTON	65.1	0.23	0.04	ND
NY:NEW YORK CITY	46.9	0.09	0.03	ND
NY:NIAGARA FALLS	53.8	0.20	0.04	ND
OH:COLUMBUS	61.3	0.19	0.04	ND
OH:PAINESVILLE	89.4	0.76	0.08	ND
PA:HARRISBURG	20.0	0.06	0.01	ND
PA:PITTSBURGH	107.5	0.45	0.08	ND
SC:BARNWELL	52.5	0.42	0.05	ND
SC:COLUMBIA	191.3	0.56	0.11	ND
VA:LYNCHBURG	25.0	0.50	0.03	ND
VA:VIRGINIA BEACH	12.5	0.20	0.02	ND
WV:CHARLESTON	41.0	0.14	0.03	ND

ND NO GAMMA ACTIVITY DETECTABLE

TABLE 6

GROSS BETA CONCENTRATION IN PRECIPITATION

AUGUST 1981

LOCATION	DEPTH (mm)	ACT. (nCi/m^2)	± e	SPECIFIC GAMMA ACT. (pCi/l)
AL:MONTGOMERY	16.3	0.09	0.01	ND
CO:DENVER	23.5	0.13	0.02	ND
CT:HARTFORD	7.3	0.07	0.01	ND
FL:JACKSONVILLE	164.5	0.46	0.11	ND
FL:MIAMI	171.3	0.09	0.08	ND
ID:BOISE	1.7	0.35	0.01	ND
IL:CHICAGO	120.8	0.27	0.07	ND
MI:LANSING	41.6	0.06	0.02	ND
MS:JACKSON	6.0	0.02	0.00	ND
MT:HELENA	3.0	0.22	0.01	ND
ND:BISMARCK	388.3	1.40	0.26	ND
NJ:TRENTON	30.8	0.19	0.02	ND
NV:LAS VEGAS	10.0	0.21	0.02	^{106}RU 44 ± 89% ZR-NB 26 ± 40%
NY:NEW YORK CITY	6.9	0.04	0.01	ND
NY:NIAGARA FALLS	24.9	0.11	0.02	ND
OH:COLUMBUS	21.5	0.07	0.01	ND
PA:HARRISBURG	41.0	0.08	0.02	ND
PA:PITTSBURGH	95.0	0.28	0.06	ND
SC:BARNWELL	100.0	0.48	0.07	ND
SC:COLUMBIA	232.5	0.46	0.13	ND
VA:LYNCHBURG	49.3	0.47	0.05	ND
VA:VIRGINIA BEACH	97.5	0.64	0.08	ND
WV:CHARLESTON	40.5	0.19	0.03	ND

ND NO GAMMA ACTIVITY DETECTABLE

TABLE 7

. GROSS BETA CONCENTRATION IN PRECIPITATION

SEPTEMBER 1981

LOCATION	DEPTH (mm)	ACT. (nCi/m^2)	± e	SPECIFIC GAMMA ACT. (pCi/l)
CO:DENVER	6.8	0.07	0.01	ND
CT:HARTFORD	38.5	0.21	0.03	ND
FL:JACKSONVILLE	15.6	0.03	0.01	ND
FL:MIAMI	138.8	0.34	0.08	ND
ID:BOISE	8.1	0.22	0.01	ND
IL:CHICAGO	66.1	0.13	0.04	ND
MI:LANSING	118.6	0.20	0.07	ND
MS:JACKSON	12.9	0.01	0.01	ND
MT:HELENA	23.8	0.12	0.02	ND
ND:BISMARCK	48.8	0.21	0.03	ND
NJ:TRENTON	51.5	0.17	0.03	ND
NV:LAS VEGAS	8.7	0.21	0.02	ND
NY:NEW YORK CITY	15.8	0.06	0.01	ND
NY:NIAGARA FALLS	111.2	0.18	0.07	ND
OH:COLUMBUS	55.0	0.06	0.03	ND
OR:PORTLAND	80.5	0.09	0.04	ND
PA:HARRISBURG	40.8	0.08	0.02	ND
PA:PITTSBURGH	27.5	0.04	0.01	ND
SC:COLUMBIA	30.0	0.11	0.02	ND
VA:LYNCHBURG	59.0	0.54	0.06	ND
VA:VIRGINIA BEACH	56.2	0.14	0.03	ND
WV:CHARLESTON	51.3	0.14	0.03	ND

ND NO GAMMA ACTIVITY DETECTABLE

TABLE 8

PRECIPITATION
TRITIUM CONCENTRATION

JULY - SEPTEMBER 1981

LOCATION	JULY nCi/l ± e	AUGUST nCi/l ± e	SEPTEMBER nCi/l ± e
AL:MONTGOMERY	0.2 0.2	0.2 0.2	NS
CO:DENVER	0.4 0.2	0.3 0.2	0.4 0.2
CT:HARTFORD	0.2 0.2	0.4 0.2	0.2 0.2
FL:JACKSONVILLE	0.3 0.2	0.2 0.2	0.2 0.2
FL:MIAMI	0.2 0.2	0.2 0.2	0.2 0.2
ID:BOISE	0.2 0.2	0.2 0.2	0.2 0.2
IL:CHICAGO	0.4 0.2	0.2 0.2	0.3 0.2
MI:LANSING	0.3 0.2	0.4 0.2	0.3 0.2
MS:JACKSON	NS	0.2 0.2	0.1 0.2
MT:HELENA	0.3 0.2	0.3 0.2	0.2 0.2
ND:BISMARCK	0.3 0.2	0.2 0.2	0.3 0.2
NJ:TRENTON	0.3 0.2	0.3 0.2	0.2 0.2
NV:LAS VEGAS	NS	0.3 0.2	0.3 0.2
NY:NEW YORK CITY	0.3 0.2	0.4 0.2	0.2 0.2
NY:NIAGARA FALLS	0.4 0.2	0.2 0.2	0.2 0.2
OH:COLUMBUS	0.3 0.2	0.3 0.2	0.3 0.2
OH:PAINESVILLE	0.3 0.2	NS	NS
OR:PORTLAND	NS	NS	0.2 0.2
PA:HARRISBURG	0.3 0.2	0.3 0.2	0.2 0.2
PA:PITTSBURGH	0.3 0.2	0.3 0.2	0.3 0.2
SC:BARNWELL	2.5 0.2	0.6 0.2	NS
SC:COLUMBIA	0.6 0.2	0.3 0.2	0.2 0.2
VA:LYNCHBURG	0.3 0.2	0.2 0.2	0.3 0.2
VA:VIRGINIA BEACH	0.3 0.2	0.4 0.2	0.1 0.2
WV:CHARLESTON	0.2 0.2	0.5 0.2	0.2 0.2

NS NO SAMPLE
e 2 SIGMA COUNTING ERROR

Plutonium and Uranium in Airborne Particulates

Environmental radiation levels of plutonium and uranium are determined by the analyses of quarterly composite samples (air filters) collected from the continuously operating airborne particulate samplers. The number of continuously operating stations is being increased from the original 22 will eventually number 67 when all equipment is operational.

Analyses of the composited filters consist of ashing, separating by liquid ion exchange, and coprecipitation of the plutonium or uranium.

Concentration of the specific isotopes of plutonium-238, -239, and uranium-234, -235, and -238 are determined by alpha spectroscopy. The volume of air analyzed normally ranges from 25,000 to 40,000 m^3 for each quarterly composite.

Plutonium and uranium in airborne particulates data for April - June 1981 are shown for the 44 stations operating during this period in Table 9.

TABLE 9

PLUTONIUM AND URANIUM IN AIRBORNE PARTICULATES
APRIL - JUNE 1981 COMPOSITES

LOCATION	^{238}Pu aCi/m^3 ± e	^{239}Pu aCi/m^3 ± e	^{234}U aCi/m^3 ± e	^{235}U aCi/m^3 ± e	^{238}U aCi/m^3 ± e
AL:MONTGOMERY	0.2 0.5	26.9 3.2	19.5 2.9	1.3 0.6	17.7 2.7
CA:BERKELEY	0.2 0.4	21.9 2.9	13.2 2.4	0.5 0.4	7.6 1.7
CA:LOS ANGELES	4.6 2.8	32.8 6.7	31.3 5.3	2.2 1.2	32.9 5.5
CT:HARTFORD	1.4 0.7	31.3 3.9	25.3 3.6	2.3 0.9	20.5 3.1
DE:DOVER	0.5 0.5	18.6 2.6	29.3 4.2	1.7 0.8	30.3 4.3
FL:JACKSONVILLE	1.5 0.9	29.4 4.0	35.5 5.3	1.9 0.9	31.2 4.9
FL:MIAMI	2.2 0.8	30.7 3.7	20.3 3.1	1.1 0.6	21.3 3.2
ID:BOISE	1.9 0.8	36.5 4.3	23.0 3.4	0.6 0.5	16.3 2.6
ID:IDAHO FALLS	3.0 1.3	32.1 4.5	42.9 6.1	3.4 1.3	39.3 5.7
IL:CHICAGO	4.1 2.1	36.8 6.4	70.3 8.7	3.2 1.3	43.2 6.1
IN:INDIANAPOLIS	0.9 1.1	21.6 3.5	36.8 5.5	2.4 1.2	37.3 5.4
KS:TOPEKA	1.3 1.1	41.0 5.0	26.2 4.3	1.2 0.9	26.4 4.3
ME:AUGUSTA	1.0 0.5	29.8 3.4	24.8 3.6	1.2 0.7	22.6 3.4
MI:LANSING	1.0 0.6	27.4 3.5	25.8 3.6	1.9 0.7	25.2 3.5
MN:MINNEAPOLIS	0.9 1.2	27.6 4.2	48.4 6.9	1.4 1.0	32.4 5.2
MO:JEFFERSON CITY	0.9 0.8	30.7 4.1	30.3 3.9	1.8 0.7	17.2 2.5
MS:JACKSON	0.5 0.6	25.9 3.1	29.1 4.0	1.3 0.7	26.0 3.7
MT:HELENA	8.3 3.4	26.9 5.2	33.9 7.4	2.2 1.7	29.5 6.8
NC:CHARLOTTE	1.1 0.4	35.0 3.7	20.4 2.5	1.1 0.4	20.4 2.5
ND:BISMARCK	1.4 2.9	24.9 5.5	68.4 10.3	2.7 2.0	40.3 7.3
NH:CONCORD	1.8 1.3	39.5 5.6	24.3 3.7	1.8 0.8	25.1 3.7
NJ:TRENTON	1.7 1.5	38.2 5.4	38.9 6.7	2.3 1.3	32.1 5.9
NM:SANTA FE	1.9 0.9	35.9 4.7	33.2 4.1	1.0 0.5	29.4 3.7
NV:LAS VEGAS	3.2 1.6	58.3 8.0	100.3 11.5	4.8 1.6	64.3 8.1
NY:ALBANY	1.7 0.7	30.0 3.6	48.0 5.9	3.1 1.0	44.9 5.6
NY:NEW YORK CITY	0.5 0.6	32.7 3.9	26.5 3.7	1.6 0.7	22.8 3.3
NY:NIAGARA FALLS	1.6 1.1	32.9 4.4	61.6 7.8	3.4 1.2	54.9 7.1
NY:YAPHANK	0.3 0.6	33.8 4.0	23.4 3.5	1.5 0.7	19.6 3.1
OH:COLUMBUS	2.5 1.8	42.1 6.6	67.8 10.1	6.9 2.5	64.8 9.7
OH:PAINESVILLE	1.4 0.9	29.3 3.6	38.7 5.3	3.3 1.1	38.5 5.3
OH:TOLEDO	2.1 1.3	35.8 5.8	54.0 6.8	3.0 1.2	48.5 6.3
OK:OKLAHOMA CITY	2.4 1.7	37.5 5.9	49.0 7.9	2.4 1.5	40.4 6.9
OR:PORTLAND	1.7 1.8	17.4 4.0	15.1 2.5	1.5 0.6	10.5 2.0
PA:HARRISBURG	0.6 0.6	32.6 3.7	25.5 3.4	0.8 0.6	21.5 3.0
PA:PITTSBURGH	0.6 1.3	31.6 4.6	64.5 8.3	2.9 1.2	54.1 7.2
RI:PROVIDENCE	1.0 0.7	38.0 4.3	37.8 4.9	1.1 0.6	27.9 3.9
SC:BARNWELL	2.1 0.8	34.0 4.3	20.2 2.5	1.3 0.5	15.1 2.1
SC:COLUMBIA	1.6 0.7	28.6 3.5	40.0 5.0	1.7 0.8	37.4 4.7
TN:KNOXVILLE	2.3 1.0	28.6 3.7	29.7 4.1	1.8 0.8	24.9 3.6
VA:LYNCHBURG	1.5 0.8	36.3 4.3	39.7 4.5	1.3 0.6	11.9 1.9
WA:SEATTLE	0.2 0.7	12.3 2.0	17.5 2.9	2.7 1.0	8.3 1.8
WA:SPOKANE	2.3 1.3	23.5 3.7	39.4 5.5	3.5 1.3	29.1 4.5
WI:MADISON	1.4 1.2	35.5 5.6	40.8 5.9	2.4 1.2	32.2 5.0
WV:CHARLESTON	2.3 1.0	38.8 4.7	48.9 5.7	1.6 0.8	43.5 5.2

PLUTONIUM RATIOS ARE CALCULATED ON UNROUNDED RAW VALUES.
THE ^{238}Pu AND ^{239}Pu CONCENTRATIONS REPORTED IN THIS TABLE HAVE BEEN ROUNDED.

TI TEMPORARILY INOPERABLE
e 2 SIGMA COUNTING ERROR

Krypton-85

Krypton-85 is a long-lived noble gas with a half life of 10.8 years. It is released into the atmosphere by nuclear reactor operations, fuel fabrication, fuel reprocessing, and nuclear detonations. Krypton-85 also occurs naturally in minor quantities primarily from the neutron capture of stable krypton-84 as well as spontaneous fission and neutron-induced fission of uranium. Monitoring of krypton-85 in the atmosphere has been conducted to identify and establish baseline levels and long-term trends.

Krypton-85 analysis began in January 1973 with sample collections and analyses being performed for 12 sampling locations. These locations were selected to provide atmospheric coverage of the United States with considerations being given to the proximity to fuel reprocessing plants, nuclear reactors, and wide geographic coverage.

Dry compressed air samples, collected at each location, are purchased from commercial air suppliers semiannually and shipped to the EERF where the krypton-85 is cryogenically separated and counted in a liquid scintillation system.

Data for January - June 1976 were reported in ERD 8.

Note. -- The recovery tracer required for the analysis of these samples is currently unavailable. When the tracer is available or new methodology developed, the samples received after June 1976 will be analyzed and reported in this report series.

ERAMS

SECTION II. Water Program

The ERAMS water program provides ambient radiation data to assess the effects of the nuclear power industry, the natural radiation environment, and other nuclear sources on the nation's rivers, streams and drinking water supplies.

Surface Water

Grab samples are taken quarterly at 58 stations located downstream from operating or future nuclear facilities.

Surface water monitoring consists of tritium analyses quarterly and gamma scans annually. Tritium is the primary radioactive pollutant from nuclear power plants, therefore, all nuclear power plants that are operating or scheduled for operation through 1980 are being monitored.

Tritium concentrations are determined by liquid scintillation counting of distilled samples. Gamma scans are performed annually to determine if there is a buildup of other contaminants.

Tritium concentrations for surface water samples for July - September 1981 are given in Table 10.

TABLE 10

SURFACE WATER
TRITIUM CONCENTRATION

JULY - SEPTEMBER 1981

LOCATION	SOURCE	DATE COLLECTED	nCi/l	± e
AL:DECATUR	TENNESSEE RIVER	7/ 2/81	0.7	0.2
AL:DOTHAN	CHATTAHOOCHIE RIVER	7/ 8/81	0.3	0.2
AL:SCOTTSBORO	TENNESSEE RIVER	7/ 9/81	0.4	0.2
AR:LITTLE ROCK	ARKANSAS RIVER	7/13/81	0.2	0.2
CA:CLAY STATION	FOLSOM S. CANAL	7/23/81	0.5	0.2
CA:DIABLO CANYON	PACIFIC OCEAN	7/15/81	0.2	0.2
CA:EUREKA	HUMBOLDT BAY	7/ 9/81	0.2	0.2
CA:SAN ONOFRE	PACIFIC OCEAN	7/14/81	0.2	0.2
CO:GREELEY	SOUTH PLATTE RIVER	7/24/81	1.1	0.2
CT:EAST HADDAM	CONNECTICUT RIVER	7/22/81	0.4	0.2
CT:WATERFORD	LONG ISLAND SOUND	7/23/81	0.2	0.2
FL:CRYSTAL RIVER	GULF OF MEXICO	7/ 6/81	0.3	0.2
FL:FT. PIERCE	ATLANTIC OCEAN	7/31/81	0.3	0.2
FL:HOMESTEAD	BISCAYNE BAY	7/30/81	0.2	0.2
IA:CEDAR RAPIDS	CEDAR RIVER	7/ 7/81	0.3	0.2
IL:E. MOLINE	MISSISSIPPI RIVER	8/15/81	0.2	0.2
IL:ZION	LAKE MICHIGAN	7/ 1/81	0.4	0.2
LA:NEW ORLEANS	MISSISSIPPI RIVER	7/10/81	0.2	0.2
MA:PLYMOUTH	CAPE CODE BAY	7/ 6/81	0.3	0.2
MA:ROWE	DEERFIELD RIVER	7/30/81	0.5	0.2
MD:CONOWINGO	SUSQUEHANNA RIVER	7/ 9/81	0.3	0.2
MD:LUSBY	CHESAPEAKE BAY	7/21/81	0.2	0.2
ME:WISCASSET	MONTSEWAY BAY	7/ 8/81	0.2	0.2
MI:BRIDGMAN	LAKE MICHIGAN	7/14/81	0.4	0.2
MI:CHARLEVOIX	LAKE MICHIGAN	7/11/81	0.3	0.2
MI:MONROE	LAKE ERIE	7/13/81	0.5	0.2
MI:SOUTH HAVEN	LAKE MICHIGAN	7/ 8/81	0.4	0.2
MN:MONTICELLO	MISSISSIPPI RIVER	7/ 7/81	0.4	0.2
MN:RED WING	MISSISSIPPI RIVER	7/14/81	0.3	0.2
MS:PORT GIBSON	MISSISSIPPI RIVER	7/16/81	0.1	0.2
NC:CHARLOTTE	CATAWBA RIVER	7/ 7/81	0.2	0.2
NC:SOUTHPORT	ATLANTIC OCEAN	8/19/81	0.1	0.2
NJ:BAYSIDE	DELAWARE RIVER	7/ 7/81	0.3	0.2
NJ:OYSTER CREEK	OYSTER CREEK	7/ 1/81	0.1	0.2
NV:BOULDER CITY	COLORADO RIVER	7/ 8/81	0.2	0.2
NY:OSSINING	HUDSON RIVER	7/ 8/81	0.4	0.2
NY:OSWEGO	LAKE ONTARIO	7/ 9/81	0.4	0.2
NY:POUGHKEEPSIE	HUDSON RIVER	7/ 8/81	0.4	0.2
OH:TOLEDO	LAKE ERIE	7/ 2/81	0.3	0.2
OR:BRADWOOD	COLUMBIA RIVER	7/26/81	0.3	0.2
PA:DANVILLE	SUSQUEHANNA RIVER	7/ 8/81	0.3	0.2
SC:ALLENDALE	SAVANNAH RIVER	7/ 2/81	3.5	0.2

TABLE 10 (CONTINUED)

SURFACE WATER
TRITIUM CONCENTRATION

JULY - SEPTEMBER 1981

LOCATION	SOURCE	DATE COLLECTED	nCi/l	± e
SC:BROAD RIVER	BROAD RIVER	7/22/81	0.4	0.2
SC:HARTSVILLE	LAKE ROBINSON	7/13/81	2.5	0.2
TN:DAISY	TENNESSEE RIVER	8/10/81	0.4	0.2
TN:KINGSTON	CLINCH RIVER	7/ 9/81	0.2	0.2
TX:EL PASO	RIO GRANDE	7/13/81	0.3	0.2
VA:DOSWELL	NORTH ANNA RIVER	7/ 2/81	1.8	0.2
WA:NORTHPORT	COLUMBIA RIVER	7/ 8/81	0.2	0.2
WA:RICHLAND	COLUMBIA RIVER	7/13/81	0.1	0.2
WI:TWO CREEKS	LAKE MICHIGAN	7/27/81	0.4	0.2
WI:VICTORY	MISSISSIPPI RIVER	7/ 9/81	0.5	0.2
WV:WHEELING	OHIO RIVER	7/ 6/81	0.3	0.2

e 2 SIGMA COUNTING ERROR

Drinking Water

The drinking water program provides ambient radiation monitoring relevant to the effects of the nuclear power industry, natural environmental insult, and other pertinent sources. These data serve to assess trends and anomalies in concentrations, and to compare with standards set forth in the EPA "National Interim Primary Drinking Water Regulations." These regulations provide for approval of supplies when the combined radium-226 and radium-228 levels do not exceed 5 pCi/l, when the gross alpha (excluding radon and uranium) levels do not exceed 15 pCi/l, when tritium levels do not exceed 20,000 pCi/l, when the strontium-90 levels do not exceed 8 pCi/l, and when the gross beta levels do not exceed 50 pCi/l.

Grab samples are taken at 78 sites which are either major population centers or selected nuclear facility environs.

The analyses include (a) tritium on a quarterly basis (b) gross alpha, gross beta, and strontium-90 on annual composites (gamma analyses are performed if the gross beta activity is greater than 10 pCi/l; radium-226 analyses are performed if the gross alpha exceeds 2 pCi/l; and radium-228 analyses are performed if the radium-226 activity falls between 3 and 5 pCi/l) (c) specific iodine-131 is performed on one quarterly sample per year for each station (d) an annual composite for plutonium-238, -239, uranium-234, -235, -238, on 22 selected sampling locations corresponding to continuously operating air particulate stations.

Tritium analyses are performed by scintillation counting of the distilled samples, gross beta, and gross alpha by evaporating an aliquot on stainless steel planchets for counting, and radium-226 by the standard emanation technique. Strontium-90 is determined by beta counting a strontium carbonate precipitate isolated by ion exchange.

The results of tritium in drinking water analyses for July - September 1981 are shown in Table 11.

Iodine-131 concentration in drinking water for July - December 1981 is shown in Table 12.

All samples were taken as either a single grab sample or composite samples taken over 12 to 14 days.

Radon-222 in Drinking Water

Radon-222 in drinking water has previously been considered a source of radiation exposure primarily from an ingestion standpoint. The Office of Radiation Programs (ORP) of the U.S. Environmental Protection Agency (EPA) is investigating radon in water supplies to evaluate the possibility that a major pathway from inhalation exposure may exist in addition to the ingestion pathway. As an inert

gas, radon is not chemically bound to the water and consequently can be released during any operation that aerates or agitates water. Depending upon the initial concentration of radon in water, significant quantities of radon could be released in a home or to the general environment.

To determine the scope of this potential problem, a national ground water sampling program has been initiated by the Eastern Environmental Radiation Facility (EERF) to obtain data on radon concentrations in water supplies throughout the country. Sampling kits have been assembled by EERF and distributed to various state health departments. The kit is designed so that state personnel can collect samples from potable water supplies and ship them, without loss of radon other than radioactive decay, to EERF for analysis.

The selection of water supplies to be sampled is handled by two separate methods. Method 1 in which each state collects samples from all groundwater supplies serving at least 1000 people and Method 2 in which the choice of sampling locations and the number of supplies to be sampled is left to the discretion of the state programs. Each state is asked to obtain a representative sampling of ground water supplies within its boundaries. The extent of the sampling efforts and how representative the data are for a given state is determined primarily by the amount of time each state devotes to the program.

The concentrations of radon in water are determined at the EERF by liquid scintillation counting. The limit of detection for this technique using a 50-minute count and a 10-ml sample is 0.16 pCi or 16 pci/l.

The sampling kits are being provided to the various states on a rotating schedule. This schedule is designed to cover the U.S. within approximately two years. As data from each state are compiled they will be published in ERD.

Summaries of the data from Idaho, Kentucky, Montana, New Hampshire, New York, Ohio and Oregon are shown in Tables 13 - 19.

TABLE 11

DRINKING WATER
TRITIUM CONCENTRATION

JULY - SEPTEMBER 1981

LOCATION	DATE COLLECTED	nCi/l	± e
AK:FAIRBANKS	7/17/81	0.3	0.2
AL:DOTHAN	7/ 8/81	0.1	0.2
AL:MONTGOMERY	7/ 8/81	0.3	0.2
AL:MUSCLE SHOALS	7/ 2/81	0.4	0.2
AL:SCOTTSBORO	7/ 9/81	0.4	0.2
AR:LITTLE ROCK	7/13/81	0.1	0.2
CA:BERKELEY	7/ 2/81	0.2	0.2
CA:LOS ANGELES	7/ 6/81	0.2	0.2
CO:DENVER	7/24/81	0.4	0.2
CO:PLATTEVILLE	7/24/81	0.4	0.2
CT:HARTFORD	7/ 7/81	0.3	0.2
DE:WILMINGTON	7/10/81	0.2	0.2
FL:TAMPA	7/28/81	0.3	0.2
GA:SAVANNAH	7/20/81	4.0	0.3
HI:HONOLULU	7/27/81	0.2	0.2
IA:CEDAR RAPIDS	7/ 2/81	0.5	0.2
ID:BOISE	7/10/81	0.4	0.2
ID:IDAHO FALLS	7/ 5/81	0.4	0.2
IL:MORRIS	7/ 1/81	0.2	0.2
IL:W. CHICAGO	7/ 1/81	0.1	0.2
KS:TOPEKA	7/22/81	0.3	0.2
LA:NEW ORLEANS	7/16/81	0.3	0.2
MA:LAWRENCE	7/14/81	0.3	0.2
MA:ROWE	7/30/81	0.3	0.2
MD:BALTIMORE	7/ 6/81	0.1	0.2
MD:CONOWINGO	7/ 9/81	0.2	0.2
ME:AUGUSTA	7/ 6/81	0.2	0.2
MI:DETROIT	7/13/81	0.6	0.2
MI:GRAND RAPIDS	7/14/81	0.4	0.2
MN:MINNEAPOLIS	7/10/81	0.5	0.2
MN:RED WING	7/17/81	0.2	0.2
MO:JEFFERSON CITY	9/23/81	0.2	0.2
MS:JACKSON	7/15/81	0.3	0.2
MS:PORT GIBSON	7/16/81	0.1	0.2
MT:HELENA	7/ 6/81	0.2	0.2
NC:CHARLOTTE	7/ 7/81	0.3	0.2
NC:WILMINGTON	8/19/81	0.4	0.2
ND:BISMARCK	7/ 7/81	0.3	0.2
NE:LINCOLN	7/ 6/81	0.2	0.2
NH:CONCORD	7/ 6/81	0.3	0.2
NJ:TRENTON	7/ 7/81	0.3	0.2
NJ:WARETOWN	7/ 1/81	0.2	0.2
NM:SANTA FE	7/ 7/81	0.2	0.2
NV:LAS VEGAS	7/ 6/81	0.5	0.2

TABLE 11 (CONTINUED)

DRINKING WATER
TRITIUM CONCENTRATION

JULY - SEPTEMBER 1981

LOCATION	DATE COLLECTED	nCi/l	± e
NY:ALBANY	7/ 3/81	0.2	0.2
NY:NEW YORK CITY	7/ 9/81	0.4	0.2
NY:NIAGARA FALLS	7/ 7/81	0.5	0.2
NY:SYRACUSE	8/ 7/81	0.4	0.2
OH:COLUMBUS	7/20/81	0.3	0.2
OH:EAST LIVERPOOL	7/14/81	0.4	0.2
OH:PAINESVILLE	7/ 7/81	0.4	0.2
OH:TOLEDO	7/ 2/81	0.3	0.2
OK:OKLAHOMA CITY	7/ 6/81	0.2	0.2
OR:PORTLAND	7/17/81	0.2	0.2
PA:COLUMBIA	7/ 9/81	0.3	0.2
PA:HARRISBURG	7/ 6/81	0.2	0.2
PA:PITTSBURGH	7/14/81	0.5	0.2
PC:ANCON	7/22/81	0.2	0.2
RI:PROVIDENCE	7/ 2/81	0.1	0.2
SC:BARNWELL	7/ 2/81	0.2	0.2
SC:COLUMBIA	7/ 2/81	0.3	0.2
SC:HARTSVILLE	7/13/81	0.1	0.2
SC:JENKINSVILLE	7/24/81	0.2	0.2
SC:SENECA	7/21/81	0.1	0.2
TN:CHATTANOOGA	7/23/81	0.4	0.2
TN:KNOXVILLE	7/ 1/81	0.3	0.2
TX:AUSTIN	7/ 9/81	0.3	0.2
VA:DOSWELL	7/21/81	0.1	0.2
VA:LYNCHBURG	7/ 2/81	0.2	0.2
VA:VIRGINIA BEACH	7/ 6/81	0.1	0.2
WA:RICHLAND	7/13/81	0.4	0.2
WI:GENOA CITY	7/ 9/81	0.1	0.2
WI:MADISON	7/10/81	0.2	0.2

e 2 SIGMA COUNTING ERROR

TABLE 12

IODINE-131 IN DRINKING WATER
JULY - DECEMBER 1981

LOCATION	DATE COLLECTED	nCi/l	±	e
AK:FAIRBANKS	7/17/81	0.0		0.1
AL:DOTHAN	10/ 1/81	0.1		0.1
AL:MONTGOMERY	7/ 8/81	0.0		0.1
AL:SCOTTSBORO	7/ 9/81	0.0		0.1
AR:LITTLE ROCK	7/13/81	0.0		0.1
CA:BERKELEY	7/ 2/81	0.0		0.2
CO:DENVER	10/30/81	0.0		0.2
CO:PLATTEVILLE	10/20/81	0.0		0.1
GA:BAXLEY	11/19/81	0.1		0.2
HI:HONOLULU	10/ 1/81	-0.1		0.1
IL:MORRIS	7/ 1/81	0.0		0.1
LA:NEW ORLEANS	7/16/81	0.0		0.1
MA:ROWE	7/30/81	0.2		0.1
MI:DETROIT	7/13/81	-0.1		0.1
MS:PORT GIBSON	7/16/81	0.2		0.1
NE:LINCOLN	7/ 6/81	-0.2		0.1
NY:NEW YORK CITY	7/ 9/81	0.0		0.1
NY:SYRACUSE	11/ 9/81	0.1		0.1
OH:CINCINNATI	10/ 1/81	0.0		0.1
OH:COLUMBUS	12/ 2/81	-0.1		0.1
PA:HARRISBURG	7/ 6/81	0.0		0.0
TN:CHATTANOOGA	7/23/81	0.1		0.1
TN:KNOXVILLE	7/ 1/81	0.1		0.1
VA:LYNCHBURG	7/ 2/81	-0.1		0.1

e 2 SIGMA COUNTING ERROR

TABLE 13

RADON IN PUBLIC GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION (pCi/l) ± 2 e *	
ID:ABERDEEN	1/13/81	1663	394.0	81.9
ID:ABERDEEN	6/19/81	1663	169.2	79.4
ID:AMERICAN FALLS	1/13/81	3400	715.5	82.2
ID:AMERICAN FALLS	4/24/81	3400	348.3	86.9
ID:AMMON	1/15/81	4600	221.9	65.4
ID:AMMON	6/18/81	4600	415.0	103.8
ID:ARCO	6/16/81	1259	1164.0	93.1
ID:ASHTON	6/17/81	1250	380.2	68.4
ID:BLACKFOOT	1/14/81	10500	1182.0	82.8
ID:BLACKFOOT	6/19/81	10500	146.7	81.1
ID:BOISE	1/28/81	105000	309.5	65.0
ID:BOISE	5/28/81	3000	237.5	90.0
ID:BOISE	5/29/81	1500	165.9	75.9
ID:BOISE	1/30/81	12000	349.9	53.6
ID:BOISE PENITENTI	5/28/81	1000	897.6	98.7
ID:BUHL	9/ 9/81	3200	1144.0	74.3
ID:BURLEY	1/16/81	8334	571.3	62.8
ID:BURLEY	9/ 9/81	8334	81.4	147.2
ID:CALDWELL	6/ 4/81	20000	247.7	117.9
ID:CHUBBUCK	4/24/81	7000	18.5	107.7
ID:CHUBBUCK	1/13/81	7000	589.9	82.6
ID:COTTONWOOD	7/14/81	1356	136.9	120.1
ID:COUNCIL	6/10/81	1000	696.4	69.6
ID:DALTON GARDENS	7/16/81	2000	364.6	93.7
ID:EMMETT	6/11/81	5000	6.8	92.8
ID:FILER	9/ 9/81	1600	87.9	140.7
ID:FRUITLAND	6/11/81	2500	805.3	104.7
ID:GARDEN CITY	5/28/81	3000	304.7	91.4
ID:GLENNS FERRY	9/ 8/81	1380	215.5	62.4
ID:GLENNS FERRY	1/22/81	1380	16.2	65.3
ID:GOODING	9/ 8/81	3200	84.6	58.6
ID:GRACE	4/23/81	1225	41.7	97.2
ID:GRANGEVILLE	7/14/81	3650	403.5	124.6
ID:HAILEY	6/28/81	2100	1294.5	193.5
ID:HOMEDALE	6/ 4/81	3000	301.0	116.2
ID:IDAHO FALLS	6/18/81	41000	245.5	98.3
ID:IDAHO FALLS	6/18/81	3000	207.6	95.5
ID:IDAHO FALLS	1/15/81	41000	158.1	69.0
ID:IONA	6/17/81	1200	37.2	62.8
ID:JEROME	9/ 8/81	7000	30.6	58.0
ID:JEROME	1/22/81	7000	-99.2	64.5
ID:KIMBERLY	1/16/81	2500	501.7	59.9
ID:KIMBERLY	9/ 9/81	2500	1148.0	160.8
ID:LAVA HOT SPRING	4/23/81	700	212.6	101.3
ID:MALAD CITY	4/23/81	2300	392.6	125.6
ID:MERIDIAN	6/ 4/81	4000	280.0	118.2
ID:MONTPELIER	4/23/81	3200	305.7	128.4
ID:MOSCOW	7/29/81	10000	-54.0	335.9
ID:MOSCOW	7/14/81	15000	4.4	122.7

* e = SIGMA ERROR

TABLE 13 (CONTINUED)

RADON IN PUBLIC GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION (pCi/l) ± 2 e *	
ID:MOUNTAIN HOME B	1/20/81	10000	-178.2	88.2
ID:MOUNTAIN HOME B	9/10/81	10000	10.9	104.5
ID:MOUNTAIN HOME	9/10/81	7500	76.4	105.7
ID:MOUNTAIN HOME	1/22/81	7500	-41.7	64.3
ID:NAMPA	6/ 3/81	25000	161.9	64.8
ID:NAMPA	6/ 3/81	1000	189.7	67.0
ID:NEW PLYMOUTH	6/11/81	1200	597.3	104.4
ID:OLDTOWN	7/15/81	300	224.6	104.0
ID:PARMA	6/11/81	1820	236.2	95.9
ID:PAUL	9/ 9/81	1000	185.8	148.4
ID:PAUL	1/16/81	1000	10.4	57.2
ID:PAYETTE	6/10/81	5500	111.5	61.0
ID:PINEHURST	7/15/81	2500	191.8	106.5
ID:PLUMMER	7/16/81	1000	278.5	90.0
ID:POCATELLO	4/24/81	20000	355.9	113.9
ID:POCATELLO	4/24/81	50	-14.1	83.2
ID:POCATELLO	1/13/81	50	-67.0	88.1
ID:POST FALLS	7/15/81	5800	520.0	109.0
ID:POST FALLS	7/15/81	1000	495.7	106.6
ID:POST FALLS	7/27/81	1500	690.7	103.1
ID:PRESTON	4/23/81	4000	-26.6	91.6
ID:RATHDRUM	7/15/81	1000	34.7	103.8
ID:REXBURG	6/17/81	11539	37.4	61.8
ID:RIGBY	6/17/81	2821	628.9	75.5
ID:RUPERT	9/ 9/81	5000	232.6	151.3
ID:RUPERT	1/16/81	5000	142.9	58.1
ID:SHELLEY	1/14/81	3200	102.6	81.2
ID:SHELLEY	6/18/81	3200	270.4	99.2
ID:SHOSHONE	9/ 8/81	1200	44.0	58.6
ID:SODA SPRINGS	4/23/81	4050	255.4	99.6
ID:SPIRIT LAKE	7/15/81	8	51.6	100.7
ID:ST. ANTHONY	6/17/81	3500	33.9	61.0
ID:SUN VALLEY	7/ 2/81	6000	850.3	218.2
ID:TWIN FALLS	9/ 9/81	29000	224.3	125.1
ID:WENDELL	9/10/81	1900	39.5	106.9
ID:WENDELL	1/16/81	1900	158.0	98.0

* e = SIGMA ERROR

TABLE 14

RADON IN PUBLIC GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION (pC1/1) ± 2 e *	
KY:AUGUSTA	7/21/81	1800	254.4	79.0
KY:BARDWELL	6/ 2/81	1100	47.5	72.8
KY:BEAVER DAM	6/ 1/81	4200	29.8	73.3
KY:BEDFORD	7/20/81	2000	250.9	91.2
KY:BENTON	6/ 1/81	5200	26.9	72.5
KY:BRANDENBURG	6/ 3/81	1625	144.1	107.0
KY:BROOKESVILLE	7/21/81	1400	150.0	74.4
KY:BUCKNER	7/20/81	12000	220.5	90.4
KY:CALVERT CITY	6/ 1/81	3500	132.3	74.8
KY:CAMPBELLSBURG	7/20/81	5610	210.2	89.3
KY:CLAY	6/ 2/81	2050	-11.5	117.0
KY:CLOVERPORT	6/ 3/81	2500	34.3	104.6
KY:DOVER	7/21/81	1600	184.2	77.7
KY:EVARTS	8/11/81	2000	22.6	67.4
KY:FANCY FARM	6/ 2/81	2100	77.4	73,3
KY:FULTON	6/ 2/81	3500	-14.7	71.6
KY:GARRISON	7/21/81	1250	218.9	78.6
KY:GHENT	7/20/81	1500	226.4	87.6
KY:GOSHEN	7/20/81	2800	177.6	89.3
KY:HAWESVILLE	6/ 3/81	1100	35.8	105.6
KY:HICKORY	6/ 2/81	2500	140.8	75.0
KY:LA CENTER	6/ 2/81	1300	390.9	79.6
KY:LEDBETTER	6/ 2/81	2200	-9.8	117.3
KY:MAYFIELD	6/ 2/81	2000	52.0	119.5
KY:MAYFIELD	6/ 2/81	1000	101.0	120.1
KY:MAYFIELD	6/ 2/81	14500	9.6	51.6
KY:MAYSVILLE	7/21/81	1900	250.8	78.4
KY:MILTON	7/20/81	2500	350.4	91.0
KY:MURRAY	6/ 1/81	20000	13.1	72.5
KY:NEON	8/25/81	2100	-23.3	69.7
KY:NORTONVILLE	6/ 1/81	2400	147.7	74.9
KY:PADUCAH	6/ 1/81	6500	7.0	72.4
KY:RACELAND	7/22/81	2585	211.6	107.9
KY:ROCKHOLD	8/ 4/81	1500	51.2	62.5
KY:SALYERSVILLE	9/29/81	2000	43.6	73.7
KY:SEBREE	6/ 2/81	1990	296.5	122.9
KY:SILVER GROVE	7/21/81	1500	-27.5	74.3
KY:SMITH'S GROVE	6/ 1/81	1000	-7.9	72.2
KY:SOUTH SHORE	7/22/81	6000	207.5	69.3
KY:SYMSONIA	6/ 2/81	1000	340.6	124.7
KY:VANCEBURG	7/21/81	3000	313.6	80.3
KY:WARSAW	7/20/81	1300	281.4	89.2
KY:WEST POINT	6/ 3/81	1300	268.6	110.1
KY:WHITE PLAINS	6/ 1/81	1200	86.1	74.1
KY:WHITESVILLE	6/ 3/81	1300	-9.1	104.8
KY:WICKLIFFE	6/ 2/81	1200	31.8	72.2
KY:WINGO	6/ 2/81	1000	6.9	71.8
KY:WINGO	6/ 2/81	2000	35.4	72.5
KY:WORTHINGTON	7/22/81	2300	204.6	109.2
KY:WURTLAND	7/22/81	1200	72.7	105.6

* e = SIGMA ERROR

TABLE 15

RADON IN PUBLIC GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION (pCi/l) ± 2 e *	
MT:ASHLAND	7/21/81	900	165.8	82.3
MT:BAKER	3/12/81	2400	350.2	59.4
MT:BELGRADE	2/26/81	2300	890.0	84.3
MT:BOULDER	2/26/81	1500	881.2	88.1
MT:BROWNING	2/24/81	2500	534.3	112.0
MT:CHOTEAU	2/23/81	1500	102.5	122.6
MT:COLUMBUS	4/16/81	1600	392.1	92.5
MT:FAIRVIEW	3/25/81	1600	110.7	80.3
MT:GLASGOW	3/27/81	4500	87.4	69.4
MT:GLENDIVE	5/19/81	1100	362.0	74.2
MT:HAMILTON	3/ 2/81	3600	1258.0	56.8
MT:HARLOWTON	4/ 3/81	1000	75.1	48.7
MT:HAVRE	4/12/81	16000	-7.8	104.9
MT:KALISPELL	3/ 5/81	12000	377.6	62.3
MT:LAME DEER	7/21/81	1000	694.2	93.6
MT:LEWISTON	3/12/81	6900	100.1	55.1
MT:MALTA	3/27/81	2400	540.8	73.1
MT:MISSOULA	3/ 3/81	1000	1889.5	56.7
MT:PLAINS	3/ 4/81	1500	377.5	67.7
MT:PLENTYWOOD	3/26/81	2500	756.5	77.3
MT:POPLAR	3/26/81	3200	434.2	73.8
MT:RAPELJE	4/29/81	65	1176.0	111.4
MT:ROUNDUP	5/ 6/81	2500	47.4	101.5
MT:SCOBEY	3/26/81	1600	199.4	72.4
MT:SHELBY	2/24/81	3100	306.1	107.2
MT:SIDNEY	3/25/81	6000	198.4	81.3
MT:SUPERIOR	3/ 4/81	1500	619.9	72.6
MT:THREE FORKS	2/26/81	1200	299.1	77.6
MT:TOWNSEND	2/26/81	1500	619.8	80.0
MT:WARM SPRINGS	2/24/81	850	318.6	110.0
MT:WHITEHALL	2/27/81	1200	679.4	72.1
MT:WOLF POINT	3/26/81	5000	73.3	74.7
MT:WORDEN	5/22/81	600	438.8	103.1

* e = SIGMA ERROR

TABLE 16

RADON IN PUBLIC GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION (pCi/l) ± 2 e *	
NH:ALTON	8/ 6/81	2700	1588.0	111.2
NH:AMHERST	8/20/81	1200	2500.0	125.0
NH:BRISTOL	8/19/81	2900	1427.0	127.5
NH:COLEBROOK	7/27/81	375	737.7	95.9
NH:CONWAY	7/ 9/81	2000	2368.0	118.4
NH:DERRY	4/20/81	8000	1032.8	93.0
NH:EPPING	9/24/81	1500	1995.0	119.7
NH:EXETER	4/23/81	11500	68.7	89.7
NH:FARMINGTON	8/ 5/81	3500	3799.0	152.0
NH:FRANKLIN	9/15/81	7000	111.4	82.5
NH:HAMPTON	5/15/81	26000	1306.5	150.0
NH:HENNIKER	8/27/81	3500	277.4	88.8
NH:HINSDALE	5/ 6/81	3700	549.1	112.1
NH:HOOKSET	4/21/81	400	3442.5	137.7
NH:HUDSON	5/13/81	6000	2579.5	103.2
NH:MERRIMACK	4/29/81	13000	1709.0	144.8
NH:MILFORD	5/19/81	7500	866.6	90.9
NH:N. WALPOLE	7/24/81	800	453.1	79.5
NH:PEMBROKE	9/ 3/81	4800	871.7	135.1
NH:PLYMOUTH	7/31/81	5500	2079.0	124.8
NH:RAYMOND	9/24/81	2395	593.2	100.9
NH:ROLLINSFORD	8/ 5/81	1800	583.7	110.7
NH:SEABROOK	7/29/81	7400	715.8	136.0
NH:WHITEFIELD	7/27/81	400	2577.0	128.9
NH:WINCHESTER	5/ 6/81	3200	161.3	107.3

* e = SIGMA ERROR

TABLE 17

RADON IN PUBLIC GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION (pCi/l) ± 2 e *	
NY:ALDEN	7/14/81	3500	70.0	80.2
NY:ALFRED	7/14/81	4000	469.8	79.9
NY:ALFRED	7/14/81	9999	320.2	73.5
NY:AMAGANSETT	7/30/81	4203	87.0	94.8
NY:AURORA	7/13/81	7200	1.1	89.8
NY:BALDWINSVILLE	7/13/81	6500	437.7	94.5
NY:BATH	7/14/81	6100	393.8	76.2
NY:BAYVILLE	7/27/81	7500	73.4	69.8
NY:BETHEL	5/14/81	5000	504.7	95.6
NY:BETHPAGE	7/31/81	33000	120.5	81.9
NY:BREWSTER	5/13/81	3200	317.7	99.0
NY:BROOKHAVEN	7/30/81	3200	81.9	100.2
NY:BROOKHAVEN	7/31/81	7850	120.9	82.1
NY:CARLE PLACE	7/28/81	11000	95.4	74.9
NY:CHESTER	5/12/81	3000	-12.6	68.7
NY:CLIFTON PARK	5/11/81	3900	92.1	62.3
NY:CLIFTON PARK	5/11/81	4200	16.3	61.4
NY:CLIFTON PARK	5/11/81	3200	6.6	61.0
NY:CLINTON	7/13/81	3000	306.0	76.3
NY:CORNING	7/14/81	17000	302.5	75.5
NY:CORNWALL	5/12/81	9000	10.2	60.9
NY:CORTLAND	7/13/81	22000	515.8	77.4
NY;CROTON ON THE H	5/13/81	8100	395.4	100.8
NY:DANNEMORA	8/19/81	3000	-32.2	73.8
NY:EAST FISHKILL	8/ 1/81	7000	558.4	108.3
NY:EAST MEADOW	7/29/81	25000	89.8	120.7
NY:EAST MEADOW	7/29/81	52000	31.7	119.0
NY:EAST MEADOW	7/29/81	50000	123.7	118.7
NY:EAST MEADOW	7/29/81	7500	62.9	60.4
NY:EAST MEADOW	7/29/81	12000	73.6	117.6
NY:ENDICOTT	7/14/81	45000	139.7	74.0
NY:FAIRHAVEN	7/13/81	3300	333.1	91.6
NY:FALLSBURGH	5/14/81	12500	647.0	96.6
NY:FARMINGDALE	7/28/81	9800	90.7	71.5
NY:FISHKILL	5/13/81	3500	197.3	98.6
NY:FISHKILL	5/13/81	3500	194.4	62.2
NY:FRANKFORT	7/13/81	3305	359.0	79.0
NY:FRANKLIN SQUARE	7/29/81	20000	64.1	123.7
NY:FREEPORT	7/29/81	45000	45.3	61.1
NY:FULTON	7/13/81	15000	264.9	90.6
NY:GARDEN CITY	7/28/81	24500	158.1	74.3
NY:GARDEN CITY	7/28/81	30000	227.1	75.9
NY:GLEN COVE	7/27/81	27000	74.8	71.8
NY:GREAT NECK	7/27/81	30000	104.2	76.5
NY:HEMPSTEAD	7/29/81	32000	16.2	121.4
NY:HEMPSTEAD	7/29/81	40000	38.1	120.7
NY:HERKIMER	7/13/81	9100	-2.6	72.7
NY:HICKSVILLE	7/28/81	57255	60.5	75.8

* e = SIGMA ERROR

TABLE 17 (CONTINUED)

RADON IN PUBLIC GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION (pCi/l) ± 2 e *	
NY:HIGHLAND FALLS	5/12/81	5500	-49.9	67.4
NY:HOMER	7/13/81	4242	364.9	77.2
NY:HOOSICK FALLS	5/14/81	4100	403.7	92.1
NY:HORSEHEADS	7/14/81	10000	473.1	78.0
NY:HUDSON	8/12/81	3900	-40.7	144.4
NY:HUDSON	5/13/81	8500	-14.3	58.7
NY:HUNTINGTON	7/28/81	40000	122.4	80.3
NY:HUNTINGTON	7/28/81	51260	117.2	79.1
NY:HUNTINGTON	7/30/81	3135	107.6	102.5
NY:HUNTINGTON	7/28/81	30000	26.1	75.9
NY:ISLIP	7/29/81	37992	54.0	63.7
NY:ISLIP	7/31/81	6000	90.0	78.5
NY:ISLIP	7/31/81	25000	125.8	79.8
NY:ISLIP	7/31/81	6600	-11.7	74.2
NY:ISLIP	7/31/81	11500	13.1	77.6
NY:JAMAICA	8/ 1/81	17850	107.5	104.0
NY:JAMESTOWN	7/14/81	39795	166.3	75.3
NY:JOHNSON CITY	7/14/81	18025	478.0	76.5
NY:LAKE GROVE	7/30/81	5000	90.6	103.5
NY:LAKE SUCCESS	7/27/81	124930	167.3	78.0
NY:LIBERTY	5/14/81	5000	791.5	102.2
NY:LITTLE FALLS	7/13/81	8000	16.2	71.2
NY:LOCUST VALLEY	7/27/81	8000	312.9	74.6
NY:LONG BEACH	7/29/81	35000	34.6	59.1
NY:LYNBROOK	7/29/81	260720	120.3	60.5
NY:MALTA	5/11/81	7000	109.8	62.5
NY:MANHASSET	7/27/81	44000	67.9	74.7
NY:MASSAPEQUA	7/29/81	51000	125.6	63.5
NY:MERRICK	7/29/81	170000	78.4	62.7
NY:MIDDLETOWN	5/13/81	23000	24.4	93.9
NY:MINEOLA	7/28/81	25000	289.7	78.3
NY:MOHAWK	7/13/81	3300	443.0	79.5
NY:MONROE	5/12/81	5000	-17.5	68.2
NY:MONTGOMERY	5/12/81	6000	332.1	66.3
NY:MORRISVILLE	7/13/81	3000	323.9	75.8
NY:MOUNT PLEASANT	8/ 1/81	3500	193.1	103.3
NY:NEWBURGH	5/12/81	9000	-43.1	58.8
NY:NEWBURGH	5/12/81	26500	7.9	60.3
NY:NIAGARA FALLS	7/14/81	8500	-7.7	80.7
NY:NISKAYUNA	5/15/81	10000	376.3	77.1
NY:OAKDALE	7/31/81	160720	62.4	76.8
NY:OWEGO	7/14/81	5000	419.1	75.4
NY:OYSTER BAY	7/27/81	10225	314.2	73.8
NY:PLAINVIEW	7/28/81	40000	131.8	77.7
NY:PORT JERVIS	5/14/81	8800	101.8	89.1
NY:PORT WASHINGTON	7/27/81	32000	4.3	72.4
NY:PORT WASHINGTON	7/27/81	3011	206.7	75.3
NY:POUGHKEEPSIE	5/13/81	5000	33.9	59.1

* e = SIGMA ERROR

TABLE 17 (CONTINUED)

RADON IN PUBLIC GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION (pCi/l) ± 2 e *	
NY:RIVERHEAD	7/30/81	9300	118.6	100.1
NY:ROCKVILLE CENTE	7/29/81	28500	22.1	60.4
NY:ROSLYN	7/27/81	27500	46.6	71.1
NY:ROSLYN HEIGHTS	7/27/81	13000	22.8	71.9
NY:ROTTERDAM	5/ 7/81	24717	267.1	89.0
NY:SCHENECTADY	5/15/81	100000	361.8	77.7
NY:SCOTIA	5/ 7/81	12097	191.4	86.6
NY:SCOTIA	5/ 7/81	7600	126.7	85.9
NY:SELDON	7/30/81	4195	119.2	102.6
NY:SHOREHAM	7/30/81	10000	150.0	100.4
NY:SMITHTOWN	7/30/81	6800	100.0	104.0
NY:SOUTH FARMINGDA	7/31/81	55000	86.4	82.7
NY:SOUTHHAMPTON	7/30/81	9000	157.4	94.1
NY:SOUTHHOLD	7/30/81	3000	86.7	92.0
NY:SOUTHHOLD	7/30/81	6851	16.2	96.0
NY:SPRINGVILLE	7/14/81	5000	287.5	77.6
NY:SUFFERN	7/27/81	9500	192.5	79.7
NY:SYOSSET	7/28/81	59000	93.6	63.3
NY:ULSTER	5/12/81	5300	-11.5	60.1
NY:VESTAL	7/14/81	3700	577.8	83.7
NY:VESTAL	7/14/81	8760	235.8	70.7
NY:VOORHEESVILLE	5/ 6/81	3200	300.5	108.1
NY:WALLKILL	5/12/81	7000	178.6	64.3
NY:WALTON	8/14/81	4000	-55.4	104.3
NY:WAPPINGERS FALL	5/13/81	3000	188.1	61.8
NY:WAPPINGERS FALL	5/13/81	5300	496.0	66.9
NY:WARSAW	7/14/81	3594	-26.5	77.8
NY:WARWICK	5/12/81	4000	22.4	69.2
NY:WAVERLY	7/14/81	5255	294.5	77.8
NY:WEBSTER	7/13/81	34000	-21.1	87.6
NY:WESTBURY	7/28/81	20050	81.9	75.3
NY:WILLISTON PARK	7/28/81	9265	109.7	147.1
NY:WOODBURY	7/28/81	4500	102.5	80.4
NY:WOODSTOCK	5/12/81	4300	728.1	74.7

* e = SIGMA ERROR

TABLE 18

RADON IN PUBLIC GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION (pCi/l) ± 2 e *	
OH:ANDOVER	7/29/81	5000	0.0	66.3
OH:ATHENS	6/22/81	23310	117.5	74.5
OH:BELLE FONTAINE	4/29/81	12000	487.6	138.9
OH:BELPRE	6/22/81	8000	372.0	81.7
OH:BRYAN	4/29/81	8000	5.8	60.5
OH:CANTON	8/ 4/81	125000	121.6	65.6
OH:CHILLICOTHE	6/23/81	6500	76.7	63.7
OH:CHILLICOTHE	6/23/81	6000	181.5	72.9
OH:CHILLICOTHE	6/23/81	28000	77.6	64.7
OH:COLUMBIANA	7/22/81	5000	54.0	66.4
OH:COSHOCTON	7/21/81	15000	218.5	64.0
OH:CRESTLINE	5/ 5/81	5947	203.6	73.9
OH:CUYAHOGA FALLS	7/29/81	60000	82.1	69.5
OH:DAYTON	8/18/81	280000	189.4	59.3
OH:DELPHOS	4/29/81	8000	11.0	61.7
OH:DOVER	7/21/81	12000	201.9	62.8
OH:EAST PALESTINE	7/22/81	6200	180.1	68.4
OH:EATON	8/10/81	6800	40.3	59.9
OH:ENGLEWOOD	8/18/81	11240	289.4	60.6
OH:FAIRBORN	6/24/81	32000	44.1	62.9
OH:FRANKLIN	8/ 5/81	65000	110.9	64.0
OH:FRANKLIN	7/14/81	12000	337.4	69.1
OH:GALLIPOLIS	6/23/81	11200	130.9	61.4
OH:GALLIPOLIS	6/23/81	5200	367.1	70.4
OH:GERMANTOWN	8/ 6/81	5652	218.6	89.7
OH:GRANVILLE	6/29/81	6800	54.0	59.3
OH:GREENFIELD	6/30/81	5200	647.2	70.7
OH:HAMILTON	8/10/81	80000	133.4	74.3
OH:HARRISON	8/ 5/81	5400	212.9	69.6
OH:HILLSBORO	6/30/81	3900	38.0	59.8
OH:HUBBARD	7/30/81	8400	1.1	88.8
OH:HUBER HEIGHTS	8/18/81	35660	685.9	68.6
OH:HUNTER	8/ 5/81	10000	45.1	64.6
OH:KENT	7/29/81	26164	35.8	67.1
OH:KINGS MILLS	8/10/81	10080	87.5	73.5
OH:LANCASTER	6/29/81	32668	31.0	60.3
OH:LEBANON	7/13/81	8500	36.8	59.7
OH:LOCKLAND	8/ 5/81	4300	69.7	67.8
OH:LOGAN	6/29/81	6500	94.4	60.8
OH:LONDON	5/ 4/81	7000	110.0	58.9
OH:LOUISVILLE	8/ 4/81	8000	33.9	60.3
OH:LOVELAND	8/ 5/81	9000	295.5	70.9
OH:LUCASVILLE	6/23/81	28000	95.6	64.9
OH:MARIETTA	6/22/81	20000	188.7	78.8
OH:MARTINS FERRY	7/22/81	17000	297.6	69.9
OH:MASON	7/13/81	7500	57.3	60.2
OH:MASSILLON	8/ 4/81	67000	57.5	61.4
OH:MIAMISBURG	8/ 6/81	17000	-7.4	85.9

* e = SIGMA ERROR

TABLE 18 (CONTINUED)

RADON IN PUBLIC GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION (pCi/l) ± 2 e *	
OH:MIAMISVILLE	7/13/81	38000	550.0	68.6
OH:MILFORD	7/13/81	15500	543.9	67.9
OH:MILLVILLE	8/10/81	20000	168.3	74.1
OH:MINGO JUNCTION	7/22/81	6600	414.0	72.4
OH:MORAINE	8/18/81	154000	283.8	62.3
OH:MORROW	7/13/81	5250	98.0	62.0
OH:MT. VERNON	7/21/81	13500	76.4	62.3
OH:N. CANTON	8/ 4/81	30000	129.3	62.3
OH:NEW CARLISLE	4/30/81	7500	117.3	107.4
OH:NEW PHILADELPHI	7/21/81	16000	155.1	62.3
OH:NEW RICHMOND	7/13/81	12194	233.9	101.8
OH:OAKWOOD	8/18/81	10500	289.4	73.6
OH:ORVILLE	8/ 4/81	9000	118.0	63.3
OH:OXFORD	8/ 5/81	22500	153.7	66.4
OH:RAVENNA	7/29/81	19500	54.8	67.4
OH:RICKENBACKER AF	6/26/81	5000	19.3	52.4
OH:RITTMAN	7/30/81	6600	28.8	87.4
OH:SHADYSIDE	7/23/81	4743	327.9	92.0
OH:SPRINGFIELD	4/30/81	6220	195.8	66.3
OH:SPRINGFIELD	4/30/81	75000	32.0	89.3
OH:ST. MARY'S	4/29/81	10000	139.9	65.1
OH:TIPP CITY	4/30/81	5500	295.6	96.1
OH:TRENTON	8/ 5/81	7000	310.0	69.7
OH:TROY	4/30/81	18000	-42.6	89.6
OH:TUPPERS PLAINS	6/22/81	6500	300.4	79.3
OH:URBANA	4/30/81	12000	680.5	113.6
OH:W. CARROLTON	8/18/81	11350	292.6	73.1
OH:WADSWORTH	7/29/81	16000	14.7	68.6
OH:WAPAKONETA	4/29/81	8000	21.3	63.6
OH:WAVERLY	6/23/81	5500	66.8	62.3
OH:WESTERVILLE	5/ 5/81	11700	51.8	72.6
OH:WESTERVILLE	6/26/81	7900	-10.5	72.1
OH:WOOSTER	8/ 4/81	20000	142.3	63.7
OH:WYONING	8/ 5/81	10000	129.4	66.9
OH:XENIA	6/24/81	25000	102.1	63.9
OH:ZANESVILLE	7/23/81	40000	138.7	88.0

* e = SIGMA ERROR

TABLE 19

RADON IN PUBLIC GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION (pCi/l) ± 2 e *	
OR:AMITY	3/27/81	1000	214.7	67.6
OR:AUMSVILLE	3/27/81	1500	382.6	69.4
OR:BEND	5/22/81	1950	150.6	95.4
OR:BEND	9/29/81	1080	128.9	128.2
OR:BORING	2/ 6/81	1200	181.2	47.8
OR:BORING	2/ 6/81	4175	159.5	47.9
OR:BURNS	9/29/81	3600	234.7	137.1
OR:CHRISTMAS VALLE	10/ 5/81	UNK	87.1	89.6
OR:DAYTON	3/27/81	1200	261.3	67.8
OR:DRAIN	5/18/81	1200	-5.3	88.0
OR:DUNDEE	3/27/81	1780	229.6	66.9
OR:ELGIN	9/28/81	1460	150.4	71.9
OR:GLADSTONE	3/24/81	10000	275.5	45.4
OR:HARRISBURG	1/22/81	1400	14.1	57.0
OR:HERMISTON	9/28/81	5500	19.1	70.4
OR:HIRES	9/29/81	1800	140.6	134.4
OR:HOOD RIVER	3/19/81	4000	214.1	55.6
OR:HOOD RIVER	3/19/81	5374	290.1	55.0
OR:HUBBARD	3/27/81	1170	120.8	67.6
OR:INDEPENDENCE	3/27/81	3145	383.4	68.8
OR:JANTZEN BEACH	3/24/81	2000	145.6	45.1
OR:JEFFERSON	1/22/81	1140	348.8	59.1
OR:JOHN DAY	9/29/81	1700	179.6	146.3
OR:JUNCTION CITY	1/22/81	2900	234.2	58.5
OR:KLAMATH FALLS	5/19/81	35000	378.8	82.4
OR:LAKE OSWEGO	3/24/81	3504	683.0	47.8
OR:LAKEVIEW	10/ 8/81	UNK	143.1	102.6
OR:LAKEVIEW	5/21/81	2740	-25.2	105.3
OR:MADRAS	5/22/81	6000	21.9	92.2
OR:MILTON-FREEWATE	9/28/81	4550	310.3	76.0
OR:MILWAUKIE	3/24/81	17300	322.7	45.2
OR:MOUNT ANGEL	1/26/81	2480	196.8	55.8
OR:NEW PINE CREEK	10/ 7/81	UNK	1219.5	134.2
OR:NEWBERG	3/27/81	10000	211.1	66.5
OR:NYSSA	9/29/81	2838	635.0	135.9
OR:OAKRIDGE	10/ 5/81	4500	228.0	77.2
OR:ODELL	3/19/81	5000	68.5	53.2
OR:ONTARIO	9/29/81	7150	195.8	128.0
OR:OREGON CITY	3/24/81	1200	25.2	43.5
OR:PAISLEY	10/ 5/81	UNK	629.2	97.4
OR:PHOENIX	5/18/81	1575	81.4	87.8
OR:PILOT ROCK	9/28/81	1750	71.8	70.7
OR:PORTLAND	3/24/81	2260	389.0	46.7
OR:PRINEVILLE	5/22/81	4800	512.4	99.9
OR:ROGUE RIVER	5/18/81	1200	124.6	89.0
OR:SALEM	1/26/81	1200	342.7	56.5
OR:SALEM	1/26/81	1338	284.6	58.3
OR:SALEM	1/26/81	2400	986.5	63.9

* e = SIGMA ERROR

TABLE 19 (CONTINUED)

RADON IN PUBLIC GROUND WATER SUPPLIES

LOCATION	COLLECTION DATE	POPULATION SERVED	Rn-222 CONCENTRATION (pCi/l) ± 2 e *	
OR:SHERWOOD	3/27/81	2000	1024.1	76.5
OR:SILVER LAKE	10/ 5/81	UNK	610.4	96.1
OR:SPRINGFIELD	4/ 7/81	38620	13.7	88.1
OR:SPRINGFIELD	4/ 7/81	14000	564.9	132.7
OR:ST. HELENS	3/18/81	7000	401.4	67.2
OR:STANFIELD	9/28/81	1250	252.9	74.6
OR:SUMMER LAKE	10/ 5/81	UNK	-36.2	86.8
OR:SUNRIVER	5/22/81	1500	-289.5	4734.2
OR:THE DALLES	3/19/81	2600	227.7	54.5
OR:UMATILLA	9/28/81	2740	90.5	72.5
OR:VALE	9/29/81	1790	350.9	126.5
OR:VALLEY FALLS	10/ 5/81	UNK	339.4	164.2
OR:VENETA	4/ 7/81	1560	383.5	130.1
OR:WARREN	3/18/81	1300	471.3	63.5
OR:WESTSIDE	10/ 7/81	UNK	282.9	119.8
OR:WOOD VILLAGE	2/ 6/81	1522	108.6	46.7
OR:WOODBURN	1/26/81	10000	415.0	64.3

UNK=UNKNOWN

* e = SIGMA ERROR

SECTION III. External Gamma Ambient Monitoring Program

The external gamma monitoring program, which began in October 1978, provides a continuous measurement of ambient gamma exposure rates, including cosmic, at selected sites throughout the continental United States. Data from this program will be used to evaluate fluctuations in natural background due to variations in environmental conditions and to provide a means of monitoring any significant increases in ambient gamma levels due to weapons fallout, reactor operations, etc. Initially, the program will consist of approximately 22 sites representing a wide geographic coverage throughout the country. Hopefully, at some later date additional sites will be added to the program. Although exposure measurements at these few sites are not totally representative of nationwide exposures, they will be indicative of national trends.

The monitoring program utilizes CaF_2:Mn thermoluminescent dosimeters (TLD's). These dosimeters are commercially available glass-bulb type dosimeters with energy compensating shields. A group of four TLD's is located at each station or site. Dosimeters are annealed by the station operator prior to positioning in the field. The dosimeters are returned to EERF for readout on an approximate one-month cycle. Several dosimeters are annealed by the station operator as controls and returned with the exposed field dosimeters to correct for any exposures accumulated during shipment.

Results from the period July 1981 through September 1981 are shown in Table 20.

TABLE 20

ENVIRONMENTAL GAMMA AMBIENT MONITORING PROGRAM

LOCATION	DATE RANGE	INTEGRATED EXPOSURE		EXPOSURE RATE	
		MR ± 2 e		MICRO R/HR ± 2 e *	
AL:MONTGOMERY	70181- 80381	8.68	8.1	10.96	8.1
AL:MONTGOMERY	80381- 90181	7.32	8.4	10.51	8.4
AL:MONTGOMERY	90181-100181	8.13	7.9	11.29	7.9
CA:BERKELEY	70281- 73181	4.06	17.6	5.84	17.6
CA:BERKELEY	73181- 83181	4.37	5.1	5.87	5.1
CA:BERKELEY	83181-100181	4.34	6.0	5.83	6.0
CO:DENVER	70781- 80581	10.31	4.5	14.81	4.5
CO:DENVER	80581- 82881	8.59	4.3	15.56	4.3
CO:DENVER	82881- 93081	10.07	4.1	12.71	4.1
FL:ORLANDO	70181- 80581	4.67	5.0	5.56	5.0
FL:ORLANDO	80581- 91581	5.48	19.1	5.57	19.1
FL:ORLANDO	91581-100181	2.06	6.7	5.35	6.7
ID:BOISE	70681- 80581	9.83	6.2	13.65	6.2
ID:BOISE	80581- 90881	11.02	4.5	13.50	4.5
ID:BOISE	90881-100581	8.46	10.1	13.06	10.1
IL:CHICAGO	70781- 80481	4.76	5.1	7.08	5.1
IL:CHICAGO	80481- 90181	5.11	7.5	7.61	7.5
IL:CHICAGO	90181-100281	11.75	4.6	15.80	4.6
ND:BISMARCK	62981- 73181	6.94	6.4	9.04	6.4
NJ:TRENTON	70681- 73181	6.38	4.7	10.64	4.7
NJ:TRENTON	73181- 90181	8.01	4.0	10.43	4.0
NJ:TRENTON	90181-100181	7.11	3.6	9.87	3.6
NM:SANTA FE	70281- 72881	8.32	8.2	13.33	8.2
NM:SANTA FE	72881- 82881	9.97	5.5	13.40	5.5
NM:SANTA FE	82881- 92581	9.23	10.0	13.74	10.0
NV:LAS VEGAS	71481- 73181	2.77	5.7	6.79	5.7
NV:LAS VEGAS	73181- 83181	5.14	4.6	6.91	4.6
NV:LAS VEGAS	83181- 93081	5.03	5.0	6.98	5.0
NY:NEW YORK	70881- 80481	4.68	4.7	7.22	4.7
NY:NEW YORK	80481- 90881	6.47	17.4	7.71	17.4
NY:NEW YORK	90881-100181	4.30	5.4	7.79	5.4
OH:COLUMBUS	70681- 73081	4.50	7.1	7.81	7.1
OH:COLUMBUS	73081- 90181	5.69	6.7	7.18	6.7
OH:COLUMBUS	90181-100181	5.37	5.3	7.45	5.3
OK:OKLAHOMA CITY	70981- 80581	5.06	6.2	7.81	6.2
OK:OKLAHOMA CITY	80581- 90881	6.36	6.3	7.79	6.3
OK:OKLAHOMA CITY	90881-100581	5.10	4.3	7.88	4.3
OR:PORTLAND	70281- 73181	5.56	4.1	7.98	4.1
OR:PORTLAND	73181- 90281	5.85	14.0	7.39	14.0
OR:PORTLAND	90281-100281	5.14	4.5	7.13	4.5
PA:HARRISBURG	70681- 80381	4.63	7.8	6.89	7.8
PA:HARRISBURG	80381- 90281	4.62	9.0	6.42	9.0
PA:HARRISBURG	90281-100281	4.68	4.8	6.50	4.8
PA:PITTSBURGH	70181- 80681	10.51	3.6	12.17	3.6
PA:PITTSBURGH	80681- 90481	8.59	6.4	12.34	6.4
PA:PITTSBURGH	90481-100281	8.21	4.2	12.22	4.2
RI:PROVIDENCE	70781- 81281	8.87	3.5	10.27	3.5
RI:PROVIDENCE	81281- 90281	5.33	4.4	10.58	4.4
RI:PROVIDENCE	90281-100881	8.89	4.0	10.29	4.0

TABLE 20 (CONTINUED)

ENVIRONMENTAL GAMMA AMBIENT MONITORING PROGRAM

LOCATION	DATE RANGE	INTEGRATED EXPOSURE		EXPOSURE RATE	
		MR ± 2 e		MICRO R/HR ± 2 e *	
SC:BARNWELL	70181- 73081	5.92	18.3	8.50	18.3
SC:BARNWELL	73081- 82781	5.64	4.4	8.39	4.4
SC:BARNWELL	82781- 92481	5.73	6.3	8.53	6.3
SC:COLUMBIA	63081- 72881	6.04	4.7	8.98	4.7
SC:COLUMBIA	72881- 82881	6.71	5.2	9.02	5.2
SC:COLUMBIA	82881- 92581	6.11	6.8	9.09	6.8
TN:KNOXVILLE	62981- 72781	6.26	10.1	9.32	10.1
TN:KNOXVILLE	72781- 82781	6.70	8.0	9.01	8.0
TN:KNOXVILLE	82781-100581	8.61	4.5	9.20	4.5
VA:RICHMOND	70181- 80181	6.92	10.1	9.30	10.1
VA:RICHMOND	80181- 83181	6.25	4.4	8.69	4.4
VA:RICHMOND	83181-100581	7.51	12.8	8.95	12.8
VT:MONTPELIER	71081- 80681	5.32	6.3	8.21	6.3
VT:MONTPELIER	80681- 90481	5.71	13.5	8.21	13.5
VT:MONTPELIER	90481-100581	6.14	4.8	8.25	4.8

* e = SIGMA ERROR (IN PERCENT)

SECTION IV. Milk Program

Pasteurized Milk

This is a cooperative program of the EPA, ORP and the Dairy and Lipid Products Branch, Milk Sanitation Section, Food and Drug Administration. Milk is a reliable indicator of the general populations intake of radionuclides since it is consumed by a large segment of the population and contains several of the biologically important contaminants resulting from environmental releases from nuclear activities. A primary function of this program is to obtain reliable monitoring data relative to current radionuclide concentrations and determine any long-term trends.

Monthly samples are collected at 65 sampling sites with one or more located in each state, Puerto Rico, and the Panama Canal. These are composite samples representing more than 80 percent of the milk consumed in major population centers.

These samples are analyzed for iodine-131, barium-140, cesium-137, and potassium. All 65 samples are analyzed annually in July for strontium-89, and strontium-90. Also, for the first month of the three quarters beginning January, April and October, 10 regional composite samples of milk made up from the states within each of EPA's 10 regions are analyzed for strontium-89 and strontium-90.

Iodine-131, barium-140, cesium-137 and potassium are determined by gamma spectral analysis. Strontium-89 and strontium-90 are determined by beta counting a total strontium precipitate which has been chemically separated by ion-exchange.

The values from the pasteurized milk samples for July - September 1981 are shown in Tables 21 - 23. Strontium 89 and 90 in pasteurized milk from all stations for July through September 1981 are shown in Table 24.

Tritium in Milk

It was previously proposed to analyze all 65 milk samples for tritium in the aqueous and organic phases, on an annual basis (on the April sample). The EERF is currently evaluating alternative analytical techniques anticipating that these analyses will begin during the coming year.

TABLE 21

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

JULY 1981

LOCATION	DATE COLLECTED	K g/l ± e	^{137}Cs pCi/l±e	^{140}Ba pCi/l±e	^{131}I pCi/l±e
AL:MONTGOMERY	7/ 9/81	1.30 0.12	0. 7.	0. 8.	0. 7.
AR:LITTLE ROCK	7/ 6/81	1.34 0.07	5. 4.	-4. 5.	-2. 4.
AZ:PHOENIX	7/ 8/81	1.43 0.08	0. 5.	-2. 6.	-2. 5.
CA:LOS ANGELES	7/ 9/81	1.47 0.12	-2. 7.	-2. 8.	1. 7.
CA:SACRAMENTO	7/ 1/81	1.41 0.12	1. 7.	-4. 8.	1. 7.
CA:SAN FRANCISCO	7/ 9/81	1.37 0.12	-1. 7.	-1. 8.	0. 7.
CO:DENVER	7/29/81	1.29 0.12	3. 7.	-10. 8.	0. 7.
CT:HARTFORD	7/ 6/81	1.53 0.12	3. 7.	2. 8.	-2. 7.
DE:WILMINGTON	7/20/81	1.31 0.12	7. 7.	-6. 8.	1. 7.
FL:TAMPA	7/ 6/81	1.34 0.12	8. 7.	1. 8.	5. 7.
GA:ATLANTA	7/ 6/81	1.41 0.12	4. 7.	-5. 8.	2. 7.
HI:HONOLULU	7/ 7/81	1.46 0.12	15. 7.	-9. 8.	1. 7.
IA:DES MOINES	7/ 6/81	1.37 0.08	4. 5.	-4. 6.	0. 5.
ID:IDAHO FALLS	7/15/81	1.39 0.22	7. 15.	-6. 19.	0. 13.
IL:CHICAGO	7/ 6/81	1.40 0.12	6. 7.	-2. 8.	-2. 7.
IN:INDIANAPOLIS	7/ 6/81	1.35 0.08	3. 5.	-5. 6.	2. 5.
KY:LOUISVILLE	7/ 7/81	1.35 0.12	1. 7.	3. 8.	0. 7.
LA:NEW ORLEANS	7/30/81	1.31 0.08	2. 5.	-7. 6.	-6. 5.
MA:BOSTON	7/ 7/81	1.40 0.12	10. 7.	-9. 8.	2. 7.
MD:BALTIMORE	7/ 6/81	1.48 0.12	4. 7.	2. 8.	-1. 7.
ME:PORTLAND	7/ 7/81	1.39 0.12	8. 7.	3. 8.	2. 7.
MI:DETROIT	7/ 8/81	1.45 0.12	3. 7.	-3. 8.	-2. 7.
MI:GRAND RAPIDS	7/ 6/81	1.42 0.12	6. 7.	-1. 8.	-3. 7.
MN:MINN/ST. PAUL	7/ 7/81	1.34 0.12	7. 7.	0. 8.	-3. 7.
MO:KANSAS CITY	7/ 9/81	1.43 0.12	2. 7.	-6. 8.	0. 7.
MO:ST. LOUIS	7/ 2/81	1.33 0.12	2. 7.	-4. 8.	-3. 7.
MS:JACKSON	7/ 7/81	1.35 0.12	1. 7.	2. 8.	0. 7.
MT:HELENA	7/ 6/81	1.45 0.08	7. 5.	-2. 6.	5. 5.
NC:CHARLOTTE	7/ 7/81	1.29 0.22	5. 15.	-17. 19.	3. 13.
ND:MINOT	7/27/81	1.36 0.12	-1. 7.	-6. 8.	0. 7.
NE:OMAHA	7/10/81	1.05 0.11	2. 7.	-2. 8.	2. 7.
NH:MANCHESTER	7/ 6/81	1.39 0.08	9. 5.	-6. 6.	2. 5.
NJ:TRENTON	7/ 9/81	1.33 0.12	-2. 7.	-4. 8.	0. 7.
NY:BUFFALO	7/ 6/81	1.43 0.08	2. 5.	-4. 6.	4. 5.
NY:NEW YORK CITY	7/ 6/81	1.39 0.12	4. 7.	-5. 8.	2. 7.
NY:SYRACUSE	7/ 6/81	1.51 0.22	8. 15.	-12. 19.	-3. 13.
OH:CINCINNATI	7/ 8/81	1.45 0.12	8. 7.	-1. 8.	-2. 7.
OH:CLEVELAND	7/ 7/81	1.37 0.12	7. 7.	-3. 8.	2. 7.
OK:OKLAHOMA CITY	7/ 6/81	1.25 0.12	7. 7.	1. 8.	1. 7.
OR:PORTLAND	7/ 6/81	1.32 0.12	5. 7.	-5. 8.	-1. 7.
PA:PHILADELPHIA	7/ 6/81	1.30 0.12	4. 7.	-6. 8.	1. 7.
PC:CRISTOBAL	7/ 8/81	1.41 0.12	12. 7.	-6. 8.	3. 7.
PR:SAN JUAN	7/10/81	1.34 0.12	5. 7.	-10. 8.	8. 7.
SC:CHARLESTON	7/21/81	1.34 0.22	13. 15.	-12. 19.	-3. 13.

TABLE 21 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

JULY 1981

LOCATION	DATE COLLECTED	K g/l ± e	^{137}Cs pCi/l±e	^{140}Ba pCi/l±e	^{131}I pCi/l±e
SD:RAPID CITY	7/ 9/81	1.35 0.12	6. 7.	-4. 8.	-2. 7.
TN:CHATTANOOGA	7/ 6/81	1.47 0.08	4. 5.	-6. 6.	2. 5.
TN:KNOXVILLE	7/ 6/81	1.40 0.12	1. 7.	+5. 8.	-1. 7.
UT:SALT LAKE CITY	7/ 9/81	1.42 0.12	8. 7.	-4. 8.	-1. 7.
VA:NORFOLK	7/ 2/81	1.46 0.08	4. 5.	0. 6.	-2. 5.
VT:BURLINGTON	7/10/81	1.34 0.12	2. 7.	-1. 8.	-1. 7.
WA:SEATTLE	7/ 6/81	1.41 0.08	0. 5.	-2. 6.	0. 5.
WA:SPOKANE	7/ 6/81	1.39 0.22	15. 15.	-11. 19.	+10. 13.
WI:MILWAUKEE	7/ 8/81	1.43 0.12	2. 7.	-5. 8.	0. 7.
WV:CHARLESTON	7/ 6/81	1.39 0.12	6. 7.	-4. 8.	+3. 7.
WY:LARAMIE	7/15/81	1.36 0.12	-1. 7.	-4. 8.	0. 7.

NS NO SAMPLE
e 2 SIGMA COUNTING ERROR

TABLE 22

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

AUGUST 1981

LOCATION	DATE COLLECTED	K g/l ± e	^{137}Cs pCi/l±e	^{140}Ba pCi/l±e	^{131}I pCi/l±e
AL:MONTGOMERY	8/ 6/81	1.40 0.12	2. 7.	-8. 8.	-2. 7.
AR:LITTLE ROCK	8/ 3/81	1.39 0.12	1. 7.	-4. 8.	3. 7.
AZ:PHOENIX	8/ 5/81	1.37 0.12	-1. 7.	-5. 8.	0. 7.
CA:LOS ANGELES	8/ 4/81	1.53 0.12	-4. 7.	-4. 8.	-3. 7.
CA:SACRAMENTO	8/ 5/81	1.30 0.22	0. 15.	+16. 19.	-16. 13.
CA:SAN FRANCISCO	8/ 6/81	1.31 0.12	2. 7.	+7. 8.	-7. 7.
CT:HARTFORD	8/ 3/81	1.31 0.08	6. 5.	-6. 6.	-2. 5.
DC:WASHINGTON	8/ 7/81	1.37 0.12	7. 7.	0. 8.	-3. 7.
DE:WILMINGTON	8/ 4/81	1.39 0.12	0. 7.	-7. 8.	-1. 7.
FL:TAMPA	8/ 3/81	1.37 0.12	12. 7.	-4. 8.	-6. 7.
GA:ATLANTA	8/24/81	1.36 0.12	-2. 7.	+7. 8.	3. 7.
HI:HONOLULU	8/ 4/81	1.39 0.08	6. 5.	-6. 6.	-2. 5.
IA:DES MOINES	8/ 3/81	1.32 0.12	-4. 7.	+3. 8.	-3. 7.
ID:IDAHO FALLS	8/ 5/81	1.29 0.21	+12. 14.	-23. 19.	-4. 13.
IL:CHICAGO	8/ 3/81	1.40 0.22	3. 15.	+24. 19.	-14. 13.
IN:INDIANAPOLIS	8/ 3/81	1.38 0.12	+2. 7.	-2. 8.	1. 7.
KS:WICHITA	8/ 7/81	1.24 0.12	3. 7.	-2. 8.	-2. 7.
KY:LOUISVILLE	8/ 6/81	1.37 0.12	1. 7.	-10. 8.	3. 7.
MA:BOSTON	8/ 4/81	1.43 0.12	7. 7.	-6. 8.	-1. 7.
MD:BALTIMORE	8/ 7/81	1.38 0.12	2. 7.	-8. 8.	+3. 7.
ME:PORTLAND	8/ 4/81	1.52 0.22	6. 15.	-15. 19.	-4. 13.
MI:DETROIT	8/ 5/81	1.39 0.08	10. 5.	-9. 6.	-7. 5.
MI:GRAND RAPIDS	8/ 3/81	1.42 0.12	3. 7.	-10. 8.	2. 7.
MN:MINN/ST. PAUL	8/10/81	1.35 0.12	4. 7.	+7. 8.	-4. 7.
MO:KANSAS CITY	8/ 7/81	1.40 0.08	2. 5.	-8. 6.	-1. 5.
MO:ST. LOUIS	8/ 5/81	1.33 0.12	6. 7.	+6. 8.	-3. 7.
MS:JACKSON	8/ 3/81	1.47 0.08	2. 5.	+7. 6.	-2. 5.
MT:HELENA	8/ 3/81	1.38 0.12	2. 7.	2. 8.	-4. 7.
NC:CHARLOTTE	8/ 4/81	1.42 0.22	-6. 14.	+17. 19.	-7. 13.
ND:MINOT	8/24/81	1.38 0.12	4. 7.	-9. 8.	-1. 7.
NE:OMAHA	8/10/81	1.35 0.12	1. 7.	-6. 8.	-5. 7.
NH:MANCHESTER	8/ 3/81	1.33 0.12	5. 7.	-7. 8.	2. 7.
NV:LAS VEGAS	8/ 4/81	1.38 0.12	-1. 7.	-2. 8.	2. 7.
NY:BUFFALO	8/ 4/81	1.48 0.12	0. 7.	-7. 8.	-2. 7.
NY:NEW YORK CITY	8/ 3/81	1.44 0.08	3. 5.	-4. 6.	-2. 5.
NY:SYRACUSE	8/ 3/81	1.36 0.12	0. 7.	0. 8.	-2. 7.
OH:CINCINNATI	8/18/81	1.29 0.12	-2. 7.	+3. 8.	-1. 7.
OH:CLEVELAND	8/11/81	1.44 0.12	2. 7.	+4. 8.	-8. 7.
OK:OKLAHOMA CITY	8/ 3/81	1.43 0.12	+1. 7.	-4. 8.	-6. 7.
OR:PORTLAND	8/ 3/81	1.39 0.12	6. 7.	+3. 8.	-1. 7.
PA:PHILADELPHIA	8/ 3/81	1.43 0.12	4. 7.	+5. 8.	-7. 7.
PA:PITTSBURGH	8/ 5/81	1.29 0.12	4. 7.	-6. 8.	2. 7.
PC:CRISTOBAL	8/10/81	1.40 0.12	6. 7.	0. 8.	+4. 7.
PR:SAN JUAN	8/14/81	1.38 0.12	1. 7.	-4. 8.	+5. 7.

TABLE 22 (CONTINUED)

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

AUGUST 1981

LOCATION	DATE COLLECTED	K g/l ± e	^{137}Cs pCi/l±e	^{140}Ba pCi/l±e	^{131}I pCi/l±e
SD:RAPID CITY	8/ 7/81	1.34 0.12	3. 7.	-6. 8.	0. 7.
TN:CHATTANOOGA	8/ 3/81	1.37 0.12	2. 7.	-3. 8.	-3. 7.
TN:KNOXVILLE	8/ 3/81	1.28 0.12	3. 7.	-3. 8.	5. 7.
TX:FT. WORTH	8/ 6/81	1.33 0.12	1. 7.	-9. 8.	-3. 7.
UT:SALT LAKE CITY	8/ 3/81	1.39 0.12	-4. 7.	-2. 8.	-1. 7.
VA:NORFOLK	8/ 7/81	1.46 0.12	3. 7.	-8. 8.	1. 7.
VT:BURLINGTON	8/ 7/81	1.43 0.12	7. 7.	0. 8.	-8. 7.
WA:SEATTLE	8/31/81	1.35 0.12	7. 7.	-5. 8.	3. 7.
WA:SPOKANE	8/ 4/81	1.39 0.07	3. 4.	-4. 5.	2. 4.
WI:MILWAUKEE	8/ 3/81	1.38 0.12	3. 7.	-2. 8.	-2. 7.
WV:CHARLESTON	8/ 3/81	1.38 0.08	2. 5.	-7. 6.	0. 5.
WY:LARAMIE	8/25/81	1.32 0.08	-2. 5.	-2. 6.	2. 5.

NS NO SAMPLE
e 2 SIGMA COUNTING ERROR

TABLE 23

CONCENTRATIONS OF RADIONUCLIDES IN PASTEURIZED MILK

SEPTEMBER 1981

LOCATION	DATE COLLECTED	K g/l ± e	^{137}Cs pCi/l±e	^{140}Ba pCi/l±e	^{131}I pCi/l±e
AZ:PHOENIX	9/ 9/81	1.46 0.08	0. 5.	-2. 6.	9. 5.
CA:SACRAMENTO	9/ 1/81	1.43 0.22	-13. 14.	-46. 29.	-9. 13.
CA:SAN FRANCISCO	9/10/81	1.53 0.12	0. 7.	-4. 8.	-5. 7.
CO:DENVER	9/29/81	1.41 0.08	7. 5.	0. 6.	20. 8.
DC:WASHINGTON	9/ 4/81	1.44 0.12	4. 7.	1. 8.	-1. 7.
DE:WILMINGTON	9/ 8/81	1.40 0.12	10. 7.	-1. 8.	7. 7.
FL:TAMPA	9/ 1/81	1.37 0.12	7. 7.	-5. 8.	0. 7.
GA:ATLANTA	9/23/81	1.44 0.13	5. 9.	-8. 11.	4. 8.
HI:HONOLULU	9/ 1/81	1.34 0.12	4. 7.	1. 8.	1. 7.
ID:IDAHO FALLS	9/ 2/81	1.31 0.12	5. 7.	-3. 8.	7. 7.
IL:CHICAGO	9/ 8/81	1.37 0.08	3. 5.	-4. 6.	4. 5.
KS:WICHITA	9/ 9/81	1.30 0.12	-3. 7.	-2. 8.	-3. 7.
MA:BOSTON	9/15/81	1.38 0.08	7. 5.	-4. 6.	2. 5.
MI:GRAND RAPIDS	9/14/81	1.41 0.12	-3. 7.	-4. 8.	-3. 7.
MS:JACKSON	9/10/81	1.39 0.22	5. 15.	-10. 19.	0. 13.
NC:CHARLOTTE	9/ 8/81	1.42 0.22	1. 15.	-15. 19.	-1. 13.
NV:LAS VEGAS	9/22/81	1.42 0.08	5. 5.	0. 6.	9. 5.
OH:CLEVELAND	9/14/81	1.34 0.12	4. 7.	-1. 8.	3. 7.
OR:PORTLAND	9/ 8/81	1.48 0.08	-2. 5.	-4. 6.	0. 5.
PA:PHILADELPHIA	9/ 8/81	1.43 0.08	4. 5.	-5. 6.	3. 5.
PC:CRISTOBAL	9/ 8/81	1.37 0.12	11. 7.	-5. 8.	-3. 7.
PR:SAN JUAN	9/11/81	1.27 0.08	7. 5.	-2. 6.	2. 5.
SC:CHARLESTON	9/ 9/81	1.42 0.08	7. 5.	-5. 6.	4. 5.
SD:RAPID CITY	9/ 3/81	1.47 0.12	6. 7.	4. 8.	-1. 7.
TN:CHATTANOOGA	9/ 8/81	1.45 0.12	6. 7.	3. 8.	1. 7.
TN:KNOXVILLE	9/ 8/81	1.43 0.12	2. 7.	2. 8.	-2. 7.
TN:MEMPHIS	9/ 9/81	1.44 0.12	3. 7.	-7. 8.	3. 7.
TX:AUSTIN	9/ 9/81	1.39 0.08	2. 5.	0. 6.	2. 5.
VT:BURLINGTON	9/ 4/81	1.33 0.12	4. 7.	0. 8.	3. 7.
WY:LARAMIE	9/18/81	1.25 0.21	6. 15.	-13. 19.	0. 13.

NS NO SAMPLE
e 2 SIGMA COUNTING ERROR

TABLE 24

STRONTIUM-90 AND STRONTIUM-89 IN PASTEURIZED MILK

ANNUAL REPORT

JULY - SEPTEMBER 1981

EPA LOCATION		^{90}Sr pCi/l ± e		^{89}Sr pCi/l ± e*	
AL:MONTGOMERY	7/ 9/81	2.5	0.8	1.	5.
AR:LITTLE ROCK	8/ 3/81	6.7	1.4	1.	5.
AZ:PHOENIX	7/ 8/81	0.9	0.9	0.	5.
CA:LOS ANGELES	7/ 9/81	0.8	0.7	1.	5.
CA:SACRAMENTO	7/ 1/81	1.0	0.9	0.	5.
CA:SAN FRANCISCO	7/ 9/81	0.6	0.4	1.	5.
CO:DENVER	7/29/81	2.4	0.8	1.	5.
CT:HARTFORD	7/ 6/81	3.5	1.1	1.	5.
DC:WASHINGTON	8/ 7/81	3.1	1.0	1.	5.
DE:WILMINGTON	7/20/81	3.6	1.0	1.	5.
FL:TAMPA	7/ 6/81	2.0	0.6	2.	5.
GA:ATLANTA	7/ 6/81	3.4	1.2	0.	5.
HI:HONOLULU	7/ 7/81	1.2	0.9	0.	5.
IA:DES MOINES	7/ 6/81	4.2	1.1	2.	5.
ID:IDAHO FALLS	7/15/81	2.4	0.8	2.	5.
IL:CHICAGO	7/ 6/81	4.8	1.2	1.	5.
IN:INDIANAPOLIS	7/ 6/81	3.0	0.8	2.	5.
KS:WICHITA	8/ 7/81	3.2	1.1	2.	5.
KY:LOUISVILLE	7/ 7/81	4.1	0.8	4.	5.
LA:NEW ORLEANS	7/30/81	4.8	1.2	1.	5.
MA:BOSTON	7/ 7/81	5.1	1.2	1.	5.
MD:BALTIMORE	7/ 6/81	4.2	1.2	0.	5.
ME:PORTLAND	7/ 7/81	4.9	1.3	0.	5.
MI:DETROIT	7/ 8/81	4.5	1.4	0.	5.
MI:GRAND RAPIDS	7/ 6/81	5.4	1.3	0.	5.
MN:MINN/ST. PAUL	7/ 7/81	4.1	1.0	2.	5.
MO:KANSAS CITY	7/ 9/81	3.9	1.0	2.	5.
MO:ST. LOUIS	7/ 2/81	3.3	0.9	3.	5.
MS:JACKSON	7/ 7/81	3.0	0.6	5.	5.
MT:HELENA	7/ 6/81	4.3	1.0	2.	5.
NC:CHARLOTTE	7/ 7/81	5.3	1.2	2.	5.
ND:MINOT	7/27/81	3.4	0.9	2.	5.
NE:OMAHA	7/10/81	1.2	0.6	1.	5.
NH:MANCHESTER	7/ 6/81	4.6	1.0	2.	5.
NJ:TRENTON	7/ 9/81	4.6	1.2	1.	5.
NV:LAS VEGAS	8/ 4/81	1.6	0.9	1.	5.
NY:BUFFALO	7/ 6/81	2.7	0.8	2.	5.
NY:NEW YORK CITY	7/ 6/81	4.2	1.1	2.	5.
NY:SYRACUSE	7/ 6/81	2.4	0.7	4.	5.
OH:CINCINNATI	7/ 8/81	3.8	1.0	2.	5.
OH:CLEVELAND	7/ 7/81	4.2	1.1	1.	5.
OK:OKLAHOMA CITY	7/ 6/81	1.9	0.5	3.	5.

TABLE 24 (CONTINUED)

STRONTIUM-90 AND STRONTIUM-89 IN PASTEURIZED MILK

ANNUAL REPORT

JULY - SEPTEMBER 1981

EPA LOCATION		^{90}Sr pCi/l ± e		^{89}Sr pCi/l ± e*	
OR:PORTLAND	7/ 6/81	3.4	1.0	2.	5.
PA:PHILADELPHIA	7/ 6/81	3.0	0.8	3.	5.
PA:PITTSBURGH	8/ 5/81	4.5	1.1	2.	5.
PC:CRISTOBAL	7/ 8/81	1.2	1.0	0.	5.
PR:SAN JUAN	7/10/81	1.0	0.5	1.	5.
SC:CHARLESTON	7/21/81	3.3	1.1	0.	5.
SD:RAPID CITY	7/ 9/81	3.5	0.9	2.	5.
TN:CHATTANOOGA	7/ 6/81	3.1	0.7	3.	5.
TN:KNOXVILLE	7/ 6/81	3.8	1.3	0.	5.
TX:FT. WORTH	8/ 6/81	3.7	1.4	0.	5.
UT:SALT LAKE CITY	7/ 9/81	3.0	1.0	1.	5.
VA:NORFOLK	7/ 2/81	3.4	1.3	0.	5.
VT:BURLINGTON	7/10/81	3.1	0.8	5.	5.
WA:SEATTLE	7/ 6/81	2.9	1.0	2.	5.
WA:SPOKANE	7/ 6/81	2.9	0.8	3.	5.
WI:MILWAUKEE	7/ 8/81	2.8	1.0	1.	5.
WV:CHARLESTON	7/ 6/81	4.9	1.2	1.	5.
WY:LARAMIE	7/15/81	0.4	0.3	1.	5.

e 2 SIGMA COUNTING ERROR

e* ANALYTICAL ERROR TERM WHICH CLOSELY APPROXIMATES THE COUNTING ERROR

Plutonium and Uranium in Milk

Ten milk sampling sites near plutonium handling facilities, plus 2 sites chosen for background information, are analyzed annually for plutonium and uranium. Analytical techniques approximate those used for air filters.

Only plutonium analyses were performed on the 1974 samples, but due to increased emphasis on levels of natural radioactivity, uranium analyses were included for 1975 - 1976 samples. Data for samples collected April 1978 were reported in ERD 14.

Iodine-129 in Milk

These analyses were designed to assess environmental levels of iodine-129 around nuclear fuel reprocessing facilities. Annual samples collected from Montgomery, Alabama (background); Idaho Falls, Idaho; Chicago, Illinois; Buffalo, New York; and Charleston, South Carolina; are analyzed for iodine-129 and stable iodine-127. Results for 1978 were reported in ERD 17.

Carbon-14 in Milk

Nine stations, chosen for wide geographical distribution, contribute milk samples for annual analysis for carbon-14. These samples have monitored the carbon-14 levels in the food chain resulting from nuclear testing.

Analysis consists of combusting the samples and measuring released carbon dioxide through liquid scintillation.

The results of carbon-14 analysis on samples collected during May 1974 were reported in ERD Report 2, September 1975.

SECTION V. Human Bone Program

The Human Bone Program (formerly Human Bone Network) began operation in 1961 to obtain data on the concentration of strontium-90 in man by age and geographical region. The target population for this network is comprised of children and young adults up to 25 years of age. The bone specimens were limited to accident victims or persons who had died of an acute disease process that was not likely to impair bone metabolism.

The following are operational characteristics of this program:

All samples are composited according to age and geographical locations.

Strontium-90, plutonium-238 and -239, and calcium analyses are performed annually on the composite samples.

No additional bone samples were procured past FY-75. Analysis of samples on hand will be completed and results evaluated.

SECTION VI. Pan American Health Organization (PAHO) Air and Milk Program

An agreement was made in 1962 with the Pan American Health Organization (PAHO) to develop a collaborative program for furnishing assistance to health authorities in the Americas for developing programs of radiological health. The agreement provided limited quantities of essential equipment on a loan basis to PAHO which were needed to establish surveillance programs, and also provided the requisite laboratory services for analysis of air particulates, milk, water, and other samples. Technical advice was given on research designs for radiological health programs.

Analyses prior to January 1977 included the following:

Milk - 4 monthly samples analyzed for gamma-emitting radionuclides, strontium-89, -90.

Air particulates - 12 stations with daily samples analyzed for gross beta.

Beginning January 1, 1977, the PAHO Air Program was discontinued and milk sampling was reduced to quarterly collection.

The PAHO programs are included organizationally as an ancillary function of the ERAMS.

Results of the Pan American surface air particulate analyses for October - December 1976 were reported in ERD 8.

Results of the Pan American milk quarterly analyses for October - December 1978 were reported in ERD 16.

Radiologic Health Section
California Department of Health

California Air Sampling Program

The Radiologic Health Section of the California Department of Health with the assistance of several cooperating agencies maintains a statewide air sampling network. One of the objectives of this program is to measure and evaluate the contribution of fixed effluent sources to particulate activity in the air. Data from air samplers placed in proximity to nuclear facilities are compared with information obtained from similar equipment in communities close to the facilities and at several "background" or control stations.

Airborne particles are collected by a continuous sampling of air filtered through a 47 millimeter membrane filter, 0.8 micrometer pore size, using a Gast air pump that provides an average sampling rate of 40 liters per minute. Air volumes are measured with a direct reading gas meter. Filters are replaced when approximately 300 cubic meters of air are collected, i.e., on a weekly or semi-weekly schedule. Charcoal cartridges mounted behind the filters at 10 of the 18 stations are replaced weekly.

All air samples are sent to the Department's Sanitation and Radiation Laboratory, where the filters are analyzed for gross beta radioactivity 72 hours after collection. Alpha activity is determined weekly on ashed filters. Gamma spectroscopy and an analysis for strontium-89 and strontium-90 are normally performed on quarterly composites from each location. Immediate gamma scans are run on any samples for which abnormal gross activity values are observed. Charcoal cartridges are analyzed for radioiodines by gamma spectroscopy as soon as received.

Data will be published as received.

Radionuclides in California Milk

Although milk is only one of the sources of dietary intake of environmental radioactivity, it is the food item that is most useful as an indicator of the general population's intake of radionuclide contaminants resulting from environmental releases. The objective of this milk sampling network is to obtain information on current radionuclide concentrations and long-term trends. From this information the need for further investigation or corrective public health action can be determined.

The California network consists of 10 stations, six of which are from dairies close to major nuclear facilities, and the other four represent controls, composited from local milksheds in similar geographic locations from the plants. Samples are obtained quarterly and analyzed immediately upon receipt.* Results are reported as pCi/l with an error of two standard deviations.

Data will be published as received.

*Radionuclides are determined by gamma spectroscopy, with the exception of iodine-131, which is analyzed in accordance with procedures specified in USNRC Regulatory Guide 4.3, and strontium-89 and strontium-90, which are determined by radiochemical technique.

Radiological Health Laboratory
Indiana State Board of Health

Indiana Milk Analysis Program

In order to evaluate the fallout on Indiana pasturelands, the State has implemented a program whereby monthly milk samples from five geographical areas are sent to the Radiological Health Laboratory of the State Board of Health. The milk in these samples is bottled on the same date in all five
from pasture to the lab.

Once in the laboratory, the milk is first analyzed by gamma spectroscopy for iodine-131, barium-140, cesium-137, and potassium-40. A one gallon sample is analyzed on a 3" x 3" NaI(Tl) scintillation crystal for 4800 seconds. A background sample of 48,000 seconds is also run. The data are analyzed to give pCi/l for each radionuclide.

A quarterly composite sample is saved and run for strontium-89 and -90 by ion exchange method.

Data will be published as received.

Radiological Health Division
State Hygienic Laboratory of Iowa

Iowa Water Sampling Program

The radiological Health Division of the State Hygienic Laboratory of Iowa with the assistance of the State Department of Environmental Quality (DEQ) maintains a state-wide water sampling program of community drinking waters, surface waters and precipitation. All analyses with the exception of the sequential Ra-226, -228 analyses are performed according to "Standard Methods for the Examination of Water and Wastewater", 14th edition. The sequential analyses for radiums are performed according to the EPA publication, EPA-600/4-75-008, "Interim Radiochemical Methodology for Drinking Water."

The drinking water samples are collected by DEQ regional personnel and sent to the State Hygienic Laboratory where they are preserved with HCl. These waters are analyzed for gross alpha and gross beta radioactivity as a screening process. Subsequent analyses for Ra-226, Ra-228, Sr-90 are performed if screening levels are exceeded. Radium levels are of primary concern in Iowa drinking waters as those levels are elevated in deep geologic aquifers within the state.

Surface waters are collected at eleven sites throughout the state with site selection being determined by proximity upstream and downstream to nuclear power plants in Iowa or those plants discharging into rivers which are natural borders with adjoining states. Gross alpha, gross beta, and tritium are the routine radionuclide analyses for these samples. Strontium is of interest when gross beta screening levels are exceeded or if nuclear weapons testing necessitates monitoring to determine its impact on the environment.

Gross Beta Activity in Air for the fourth quarter, 1980, is in Table 25.

Background Radiation Levels, Tritium, are in Table 26.

Gross Radiation in Precipitation for the fourth quarter, 1980, is in Table 27.

Gross Activity in Surface Water reported as pCi/l for fourth quarter, 1980, is in Table 28.

SDWA (Safe Drinking Water Act) analyses for October, November and December, 1980 are shown in Tables 29, 30 and 31 respectively.

DEQ Mineral Samples for October, November and December, 1980, are shown in Tables 32, 33 and 34 respectively.

The results for the first three quarters of 1981 are available but because of space restrictions they are not included in this report. They will be published in the forthcoming reports.

Table 25

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
GROSS BETA ACTIVITY IN AIR
4TH QUARTER 1980

October, November, December 1980

SAMPLE #	DATE SAMPLED	AIR VOLUME m^3	pCi/m^3
		AMES	
265354	10-06-80	1795	0.04
265355	10-12-80	1798	0.01
265722	10-24-80	1784	0.01
265723	10-30-80	1795	0.05
265724	11-05-80	1713	0.02
265725	11-11-80	1752	0.02
265976	11-17-80	1786	0.07
265977	11-23-80	1845	0.04
265978	11-29-80	1661	0.01
265979	12-05-80	1975	0.08
266112	12-11-80	1960	0.09
266111	12-17-80	1930	0.11
266236	12-23-80	1901	0.09
266237	12-29-80	1847	0.14
		Average of 14	0.06
		DAVENPORT	
265633	10-06-80	1632	0.03
265899	10-18-80	1629	0.01
265893	10-24-80	1672	0.02
265888	10-30-80	1710	0.05
265884	11-05-80	1672	0.03
265629	11-11-80	1713	0.02
266172	11-17-80	1753	0.07
266166	11-23-80	1713	0.05
266165	11-29-80	1751	0.01
266381	12-05-80	1787	0.09
266379	12-11-80	1842	0.09
266376	12-17-80	1777	0.10
266371	12-23-80	1814	0.09
266370	12-29-80	1908	0.02
		Average of 14	0.05

Table 25 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
GROSS BETA ACTIVITY IN AIR
4TH QUARTER 1980

October, November, December 1980

SAMPLE #	DATE SAMPLED	AIR VOLUME m^3	pCi/m^3
		DUBUQUE	
129738	10-06-80	1621	0.02
265716	10-12-80	1663	0.01
265718	10-24-80	1622	0.01
265719	10-30-80	1587	0.01
265720	11-05-80	1582	0.01
266007	11-12-80	1580	0.01
266008	11-17-80	1621	0.02
266009	11-23-80	1621	0.05
266010	11-29-80	1621	0.03
266011	12-05-80	1608	0.05
266270	12-11-80	1695	0.07
266271	12-17-80	1619	0.11
266273	12-23-80	1675	0.06
266274	12-29-80	1666	0.13
		Average of 14	0.04
		COUNCIL BLUFFS	
129752	10-06-80	1567	0.07
129746	10-12-80	1643	0.02
265752	10-24-80	1720	0.01
265757	10-30-80	1763	0.06
265765	11-05-80	1670	0.02
265769	11-11-80	1674	0.03
266037	11-17-80	1693	0.09
266042	11-23-80	1761	0.05
265949	11-29-80	1749	0.02
266029	12-05-80	1855	0.10
266033	12-11-80	1895	0.16
266190	12-17-80	1770	0.19
266194	12-23-80	1890	0.11
266198	12-29-80	1871	0.12
		Average of 14	0.08
		MASON CITY	
265559	10-06-80	1855	0.04
265838	10-30-80	1933	0.03
265564	11-11-80	2261	0.02
265844	11-17-80	2221	0.03
266069	11-23-80	2220	0.03
266065	11-29-80	2301	0.01
266056	12-05-80	2260	0.05
266059	12-11-80	2052	0.06
266330	12-17-80	1827	0.12
266317	12-23-80	1744	0.09
266062	12-29-80	1815	0.11
		Average of 11	0.05

Table 25 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
GROSS BETA ACTIVITY IN AIR
4TH QUARTER 1980
October, November, December 1980

SAMPLE #	DATE SAMPLED	AIR VOLUME m^3	pCi/m^3
		OTTUMWA	
129997	10-06-80	1912	0.04
265534	10-12-30	1871	0.02
265536	10-18-80	1913	0.01
265538	10-24-80	1995	0.01
265653	10-30-80	1795	0.05
265655	11-05-80	1834	0.01
265866	11-11-80	1886	0.02
265868	11-17-80	1983	0.06
265870	11-23-80	2034	0.04
265872	11-29-80	1952	0.01
265874	12-05-80	1939	0.08
266091	12-17-80	1995	0.11
266093	12-23-80	2067	0.09
266095	12-29-80	2016	0.13
		Average of 14	0.05
		SIOUX CITY	
265616	10-06-80	1876	0.05
265910	11-11-80	1891	0.04
265907	11-11-80	1893	0.02
265903	11-17-80	1893	0.07
266155	12-05-80	1925	0.11
266160	12-11-80	1963	0.19
266162	12-17-80	1913	0.13
266402	12-23-80	1971	0.09
266398	12-29-80	1923	0.15
		Average of 9	0.09
		WATERLOO	
265595	10-06-80	1952	0.03
265596	10-12-80	1910	0.01
265598	10-18-80	1950	0.03
265601	10-30-80	1993	0.05
265602	11-05-80	1951	0.01
265603	11-11-80	1951	0.03
265604	11-17-80	1993	0.05
265923	11-23-80	2040	0.04
265924	11-29-80	1991	0.01
265925	12-05-80	2034	0.06
265926	12-11-80	2089	0.07
265927	12-17-80	2034	0.12
265928	12-23-80	2072	0.11
265929	12-29-80	2149	0.11
		Average of 14	0.05

Table 26

UNIVERSITY HYGIENIC LABORATORY
STATEWIDE DYNAMIC SURFACE WATEP REPORT
Background Radiation Levels, Tritium

Data for 4th Quarter 1980

Date Collected	Date Counted	^{3}H Activity, nCi/l
10-16-80	02-08-81	<1.14
10-17-80	02-08-81	<1.14
10-24-80	02-08-81	<1.14
10-28-80	02-08-81	<1.14
11-14-80	02-08-81	<1.14
12-02-80	02-08-81	<1.14
12-09-80	02-08-81	<1.14

Table 26 (Continued)

UNIVERSITY HYGIENIC LABORATORY
STATEWIDE DYNAMIC SURFACE WATER REPORT
Gackground Radiation Levels, Tritium

Data for 4th Quarter 1980

River	City	Dates Collected Composite Samples	Date Counted	^{3}H Activity nCi/l
Cedar	Cedar Rapids	10-8, 14, 21, 28-80	02-08-81	<1.14
	Cedar Rapids	11-4, 18, 25-80	02-08-81	<1.14
	Cedar Rapids	12-2, 9, 16, 23, 30-80	02-08-81	<1.14
	Vinton	10-6, 13, 20, 27-80	02-08-81	<1.14
	Vinton	11-3, 10, 17, 24-80	02-08-81	<1.14
	Vinton	12-1, 9, 15-80	02-08-81	<1.14
Des Moines	Des Moines	10-4-80	02-08-81	<1.14
	Des Moines	12-11-80	02-08-81	<1.14
Iowa	Iowa City	10-8-80	02-08-81	<1.14
	Iowa City	11-3-80	02-08-81	<1.14
	Iowa City	12-1-80	02-08-81	<1.14
Mississippi	Davenport	10-2, 8, 16, 23, 30-80	02-08-81	<1.14
	Davenport	11-6, 13, 20, 26-80	02-08-81	<1.14
	Davenport	12-4, 11, 18, 29-80	02-08-81	<1.14
	Dubuque	10-3, 9, 17, 23, 30-80	02-08-81	<1.14
	Dubuque	11-6, 13, 20, 26-80	02-08-81	<1.14
	Dubuque	12-4, 11, 18, 26-80	02-08-81	<1.14
	Lansing	10-6, 14, 20, 27-80	02-08-81	<1.14
	Lansing	11-3, 10, 17-80	02-08-81	<1.14
	Lansing	12-8, 22, 29-80	02-08-81	<1.14
Missouri	Council Bluffs	10-1, 7, 15, 21, 27-80	02-08-81	<1.14
	Council Bluffs	11-10, 17, 25-80	02-08-81	<1.14
	Council Bluffs	12-1, 9, 15, 22, 29-80	02-08-81	<1.14
	Sioux City	10-6, 13, 20-80	02-08-81	<1.14
	Sioux City	11-3, 10, 17, 24-80	02-08-81	<1.14
	Sioux City	12-9, 15, 22-80	02-08-81	<1.14
Nishnabotna	Hamburg	10-6-80	02-08-81	<1.14
	Hamburg	11-3-80	02-08-81	<1.14
	Hamburg	12-1-80	02-08-81	<1.14
Skunk	Ames	10-1, 9, 16, 23-80	02-08-81	<1.14
	Ames	11-20-80	02-08-81	<1.14
	Ames	12-11-80	02-08-81	<1.14

Table 27

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
IOWA CITY PRECIPITATION
GROSS RADIATION

Data for October, November, December 1980

RADIATION #	DATE SAMPLED	AMOUNT PRECIPITATION mm	WATER COLLECTED l	ACTIVITY IN pCi/l	
				ALPHA (DS)	BETA-GAMMA (DS)
17209	10-16-80	2.7	0.4	0.1	5
17213	10-17-80	11.3	1.7	0.2	2
17236	10-24-80	11.3	1.7	0.2	3
17287	10-28-80	11.3	1.7	0.5	4
17350	11-14-80	5.3	0.8	0.5	14
17468	12-02-80	10.0	1.5	0.7	13
17489	12-09-80	26.7	4.0	0.3	7
		Highest		0.7	14
		Lowest		0.1	2
		Average of 7		0.4	7
		Total amount collected	11.8		

Table 28

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL SURFACE WATER SURVEILLANCE
GROSS ACTIVITY REPORTED AS pCi/l

Data for October, November, December 1980

RADIATION #	DATE SAMPLED	ALPHA ACTIVITY TS	DS	SS	BETA-GAMMA ACTIVITY TS	DS	SS
		SKUNK RIVER AT AMES					
17186	10-01-80	4.1	2.0	2.1	3	2	1
17199	10-09-80	1.5	0.6	0.9	3	3	Nil
17211	10-16-80	2.5	1.1	1.4	5	5	Nil
17234	10-23-80	1.2	0.7	0.5	8	7	1
17429	11-20-80	2.0	1.6	0.4	6	4	2
17499	12-11-80	1.0	1.0	Nil	9	9	Nil
	Average of 6	2.1	1.2	0.9	6	5	1
		CEDAR RIVER AT CEDAR RAPIDS					
17198	10-08-80	1.8	1.6	0.2	4	2	2
17210	10-14-80	1.9	1.3	0.6	3	3	Nil
17237	10-21-80	1.6	1.3	0.3	3	2	1
17333	10-28-80	0.6	0.2	0.4	4	4	Nil
17334	11-04-80	1.4	1.1	0.3	3	2	1
17408	11-18-80	1.1	0.7	0.4	2	2	Nil
17438	11-25-80	1.7	1.4	0.3	1	1	Nil
17472	12-02-80	0.6	0.4	0.2	3	3	Nil
17490	12-09-80	0.4	0.4	Nil	2	2	Nil
17535	12-23-80	2.0	1.5	0.5	2	2	Nil
17536	12-16-80	0.6	0.6	Nil	3	3	Nil
17561	12-30-80	0.9	0.8	0.1	3	3	Nil
	Average of 12	1.2	0.9	0.3	3	2	1

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL SURFACE WATER SURVEILLANCE
GROSS ACTIVITY REPORTED AS pCi/l

Data for October, November, December 1980

RADIATION #	DATE SAMPLED	ALPHA ACTIVITY TS	ALPHA ACTIVITY DS	ALPHA ACTIVITY SS	BETA-GAMMA ACTIVITY TS	BETA-GAMMA ACTIVITY DS	BETA-GAMMA ACTIVITY SS
		MISSOURI RIVER AT COUNCIL BLUFFS					
17193	10-07-80	3.9	2.5	1.4	5	5	Nil
17197	10-01-80	2.2	1.2	1.0	9	7	2
17229	10-15-80	7.2	6.5	0.7	4	4	Nil
17235	10-21-80	2.0	0.9	1.1	9	8	1
17326	10-27-80	4.3	3.9	0.4	2	1	1
17345	11-10-80	9.2	1.7	7.5	6	6	Nil
17401	11-17-80	1.4	1.4	0.0	5	5	Nil
17466	11-25-80	3.2	1.6	1.6	7	5	2
17495	12-01-80	1.3	1.3	Nil	7	7	Nil
17507	12-09-80	2.2	1.9	0.3	9	8	1
17511	12-15-80	9.0	3.6	5.4	7	7	Nil
17560	12-29-80	4.0	2.9	1.1	Nil	Nil	Nil
17562	12-22-80	3.9	3.9	Nil	2	1	1
	Average of 13	4.1	2.6	1.5	6	5	1
		MISSISSIPPI RIVER AT DAVENPORT					
17194	10-08-80	1.3	1.0	0.3	4	4	Nil
17202	10-02-80	1.7	0.5	1.2	6	3	3
17212	10-16-80	0.8	0.6	0.2	4	3	1
17232	10-23-80	1.1	0.6	0.5	1	Nil	1
17325	10-30-80	1.4	0.7	0.7	4	3	1
17338	11-06-80	0.7	0.5	0.2	2	2	Nil
17349	11-13-80	1.2	0.4	0.8	3	2	1
17409	11-20-80	1.7	1.4	0.3	2	2	Nil
17436	11-26-80	1.3	0.8	0.5	2	2	Nil
17491	12-04-80	0.9	0.7	0.2	1	1	Nil
17498	12-11-80	Nil	Nil	Nil	3	3	Nil
17532	12-18-80	0.8	0.8	Nil	1	1	Nil
17542	12-29-80	1.0	0.5	0.5	3	3	Nil
	Average of 13	1.1	0.7	0.4	3	2	1

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL SURFACE WATER SURVEILLANCE
GROSS ACTIVITY REPORTED AS pCi/l

Data for October, November, December 1980

RADIATION #	DATE SAMPLED	ALPHA ACTIVITY TS	ALPHA ACTIVITY DS	ALPHA ACTIVITY SS	BETA-GAMMA ACTIVITY TS	BETA-GAMMA ACTIVITY DS	BETA-GAMMA ACTIVITY SS
		DES MOINES RIVER AT DES MOINES					
17336	11-04-80	3.3	2.9	0.4	4	3	1
17496	12-11-80	4.0	3.7	0.3	6	5	1
	Average of 2	3.7	3.3	0.4	5	4	1
		MISSISSIPPI RIVER AT DUBUQUE					
17185	10-03-80	1.4	0.4	1.0	4	3	1
17200	10-09-80	0.6	0.2	0.4	4	3	1
17223	10-17-80	4.5	4.3	0.2	1	Nil	1
17233	10-23-80	0.2	0.2	0.0	5	4	1
17324	10-30-80	0.9	0.7	0.2	4	4	Nil
17337	11-06-80	0.8	0.7	0.1	4	2	2
17400	11-13-80	0.5	0.5	0.0	3	3	Nil
17430	11-20-80	0.6	0.4	0.2	2	2	Nil
17437	11-26-80	1.2	0.9	0.3	4	3	1
17473	12-04-80	0.9	0.9	Nil	4	4	Nil
17500	12-11-80	0.1	0.1	Nil	3	3	Nil
17533	12-26-80	1.3	1.3	Nil	1	1	Nil
17537	12-18-80	0.3	0.1	0.2	3	3	Nil
	Average of 13	1.0	0.8	0.2	3	3	Nil
		NISHNABOTNA RIVER AT HAMBURG					
17196	10-06-80	2.8	1.9	0.9	7	7	Nil
17335	11-03-80	2.1	1.8	0.3	5	5	Nil
17470	12-01-80	2.8	1.4	1.4	4	4	Nil
	Average of 3	2.6	1.7	0.9	5	5	Nil

Table 28 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL SURFACE WATER SURVEILLANCE
GROSS ACTIVITY REPORTED AS pCi/l

Data for October, November, December 1980

RADIATION #	DATE SAMPLED	ALPHA ACTIVITY TS	DS	SS	BETA-GAMMA ACTIVITY TS	DS	SS
		IOWA RIVER AT IOWA CITY					
17192	10-08-80	2.2	1.8	0.4	5	5	Nil
17323	11-03-80	3.5	2.9	0.6	4	4	Nil
17464	12-01-80	2.7	2.3	0.4	4	4	Nil
	Average of 3	2.8	2.3	0.5	4	4	Nil
		MISSISSIPPI RIVER AT LANSING					
17195	10-06-80	4.1	1.2	2.9	3	3	Nil
17208	10-14-80	4.2	3.8	0.4	1	Nil	1
17224	10-20-80	1.6	0.6	1.0	6	4	2
17286	10-27-80	1.4	0.7	0.7	3	3	Nil
17332	11-03-80	1.8	1.0	0.8	5	5	Nil
17343	11-10-80	1.6	1.2	0.4	4	4	Nil
17403	11-17-80	0.6	0.5	0.1	3	3	Nil
17493	12-08-80	1.0	1.0	Nil	2	2	Nil
17534	12-22-80	0.8	0.7	0.1	2	2	Nil
17538	12-29-80	1.0	0.5	0.5	2	2	Nil
	Average of 10	1.8	1.1	0.7	3	3	Nil
		MISSIOURI RIVER AT SIOUX CITY					
17188	10-06-80	4.8	3.8	1.0	6	6	Nil
17204	10-13-80	2.7	2.3	0.4	7	5	2
17225	10-20-80	4.0	1.9	2.1	9	5	4
17328	11-03-80	7.2	5.5	1.7	3	2	1
17346	11-10-80	1.8	0.8	1.0	6	6	Nil
17402	11-17-80	4.6	4.1	0.5	6	6	Nil
17435	11-24-80	4.1	3.7	0.4	5	4	1
17492	12-09-80	4.0	4.0	Nil	5	4	1
17512	12-15-80	1.0	0.7	0.3	7	7	Nil
17541	12-22-80	2.1	1.2	0.9	6	4	2
	Average of 10	3.6	2.8	0.8	6	5	1

Table 28 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL SURFACE WATER SURVEILLANCE
GROSS ACTIVITY REPORTED AS pCi/l

Data for October, November, December 1980

RADIATION #	DATE SAMPLED	ALPHA ACTIVITY TS	DS	SS	BETA-GAMMA ACTIVITY TS	DS	SS
		CEDAR RIVER AT VINTON					
17189	10-06-80	2.5	1.6	0.9	3	2	1
17203	10-13-80	0.5	0.2	0.3	4	2	2
17226	10-20-80	1.3	0.9	0.4	3	3	Nil
17285	10-27-80	0.9	0.6	0.3	4	3	1
17329	11-03-80	2.0	1.2	0.8	3	3	Nil
17344	11-10-80	1.7	1.1	0.6	3	3	Nil
17404	11-17-80	2.0	1.9	0.1	Nil	Nil	Nil
17432	11-24-80	2.9	2.3	0.6	2	2	Nil
17465	12-01-80	8.3	7.6	0.7	Nil	Nil	Nil
17494	12-09-80	0.8	0.8	Nil	3	3	Nil
17508	12-15-80	0.7	0.7	Nil	2	2	Nil
	Average of 11	2.1	1.7	0.4	2	2	Nil

Table 29

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for October 1980

TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l ALPHA	BETA	^{226}Ra	^{228}Ra
Forest City	Winnebago	Well, 140'	15132A	06-05-79 12-03-79 03-10-80 06-09-80	7.0	Nil	3.6	<0.6
Kelley	Story	Well #1, 216'	15205A	06-13-79 10-23-79 04-07-80 07-29-80	11	Nil	0.2	0.7
Arcadia	Carroll	Finished	15362A	07-09-79 10-08-79 04-08-80 08-14-80	5.7	19	3.5	1.3
Fayette	Fayette	Finished	15662A	11-27-79 03-11-80 09-08-80	1.7	6		

Table 30

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for November 1980

TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l ALPHA	pCi/l BETA-GAMMA
Baxter	Jasper	Well #1, 68'	15678A	12-10-79 03-10-80 06-17-80 10-06-80	0.6	Nil

Table 31

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for December 1980

TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l ALPHA	BETA	^{226}Ra	^{228}Ra
Minden	Pottawattamie	Finished	14538A	01-02-80	3.4	2	0.4	<0.5
				07-01-80				
				09-28-80				
Danbury	Woodbury	Finished	14717A	01-22-79	<0.2	5		
				12-10-79				
				04-08-80				
				12-08-80				
Oelwein	Fayette	Finished	15068B		1.8	7		
				05-23-80				
				08-22-80				
				11-25-80				
Rock Rapids	Lyon	Well #D-2, 40'	15187A	06-12-79	3.9	10	<0.25	1.0
				04-01-80				
				09-29-80				
Rock Rapids	Lyon	Well #S-3, 40'	15188A	06-12-79	0.9	8		
				04-01-80				
				09-29-80				
Glenwood	Mills	Well #1&3, 90'	15562A	10-15-79	1.0	2		
				01-28-80				
				07-07-80				
				09-29-80				

Table 31 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
SDWA SAMPLES

Data for December 1980

TOWN	COUNTY	IDENTIFICATION	RADIATION # OR MINERAL #	DATE SAMPLED	pCi/l ALPHA	BETA	^{226}Ra	^{228}Ra
Lake Mills	Winnebago	Well #2, 425'	15658A	11-26-79 02-12-80 05-29-80 09-23-80	0.7	2		
Shenandoah	Page	Finished	15793A	01-21-80 04-15-80 07-22-80 10-06-80	1.0	4		
Thompson	Winnebago	Well	R15912	03-11-80 06-10-80 09-11-80 12-08-80	1.0	4		
Cedar alls	Black Hawk		R15888	03-11-80 06-10-80 09-10-80 12-05-80	<0.2	1		

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
DEQ MINERAL SAMPLES

Data for October 1980

TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
DEQ Region 2	Cerro Gordo	NWSPC Co. - Lagoon	15570	10-17-79	7.2	1191.0	0.6	
Blencoe	Monona	Well #1, 85'	15575		15.8	Nil	0.8	
Blencoe	Monona	Well #2, 85'	15576	10-18-79	3.6	10	0.9	
New Albin	Allamakee	Well (raw water)	15579	10-22-79	9.6	2	4.3	
Tabor	Fremont	Well #2, 62'	15587	10-24-79	3.1	5	0.5	
Tabor	Fremont	Well #1, 62'	15589	10-24-79	6.0	9	0.6	
Shenandoah	Page	Well #20	15590	10-25-79	14.2	16	1.0	
Logan	Harrison	Well #7, 60'	15620	11-06-79	13	Nil	0.6	
Blairstown	Benton	Well #1, Raw water	15640	11-15-79	5.4	17	5.5	
Graettinger	Palo Alto	Well #5, raw	15770	01-14-80	7.3	52	1.1	
Badger	Webster	Well #2, raw	15772	01-14-80	5.9	Nil	1.0	
Maquoketa	Jackson	Well #5, 2130'	15879	02-19-80	4.4	14	3.7	3.1
Maquoketa	Jackson	Well #4, 2140'	15921	02-19-80	5.9	12	3.0	3.5
Knoxville	Marion	Well #3, 2225'	16036	04-07-80	8.3	23	5.0	2.5
Ridgeway	Winneshiek	Well #1, 190'	16207	05-14-80	4.8	1	0.5	2.0
Anamosa	Jones	Well #4, 1540'	16209	05-14-80	5.4	14	3.3	1.9

Table 32 (Continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
DEQ MINERAL SAMPLES

Data for October 1980

TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{22}
Audubon	Audubon	Well #15	16211	05-13-80	3.8	6	1.2	3.7
Elgin	Fayette	Well #1, 208'	16256	06-04-80	4.2	Nil	0.4	1.
Mediapolis	Des Moines	Well #5, 130-140'	16259	06-05-80	3.4	1	1.4	1.
West Amana	Iowa	Well #11, 32'6"	16260	06-05-80	5.9	17	0.3	2.6
Vinton	Benton	Well #4, 90'	16275	06-10-80	5.0	Nil	0.4	<0.6
Mt. Pleasant	Henry	Well #1, 1900'	16297	06-18-80	21	17	8.0	1.7
Larchwood	Lyon	Well #2, 575'	16299	06-19-80	3.3	6	0.4	2.6
Larchwood	Lyon	Well #3, raw water	16300	06-19-80	3.1	4	2.8	1.
Indianola	Warren	Well #9, 2525'	16303	06-23-80	8.2	11	4.3	3.7
Indianola	Warren	Well #11	16304	06-23-80	6.6	9	4.5	0.9
Otho	Webster	Well #3	16318	06-26-80	4.4	4	1.9	1.4
Terril	Dickinson	Well #1	16333	07-02-80	5.0	Nil	0.6	<0.6
Thor	Humboldt	Well #2, 375'	16377	07-11-80	13	Nil	1.6	1.0
Thor	Humboldt	Well #1, 375'	16378	07-11-80	6.0	9	7.8	4.0
Center Junction	Jones	Well #1, 300'	16395	07-17-80	6.2	Nil	2.2	1.9
Earlham	Dallas	Well West, 500'	16504	08-27-80	6.0	6	1.2	1.8
Walnut	Pottawattamie	Well #2, 2635'	16508	08-27-80	14	27	3.9	6.9
Dakota S.S.		Well #D-46, 600'	16512	08-27-80	0.5	13		

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
DEO MINERAL SAMPLES

Data for October 1980

TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}
Union	Hardin	Well #2 (North)	16517	09-05-80	1.4	7		
Waterloo	Black Hawk	Well 300'	16522	09-08-80	Nil	3		
Mt. Auburn	Benton	Well #1, 600'	16523	09-10-80	2.4	Nil		
Mt. Auburn	Benton	Well #1, 600'	16524	09-10-80	0.9	3		
Moville	Woodbury	Well #4	16526	09-11-80	0.6	4		
Orient	Adair	Surface water	16535	09-18-80	1.2	6		
Hardy	Humboldt	Well #2, 98'	16536	09-22-80	1.1	7		
Mahaska	Mahaska	Well #1 & 3	16543	09-23-80	1.2	1		

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
DEQ MINERAL SAMPLES

Data for November 1980

TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}
Denmark	Lee	Raw Water	15911	02-28-80	17	28	3.8	1.4
Renwick	Humboldt	Well #1, 260'	16381	07-11-80	5.5	1	1.9	<0.6
Des Moines	Polk	Fee exempt	16409		4.4	8	0.7	<0.6
Luana	Clayton	Well #1, 340'	16560	09-25-80	2.5	Nil		
Radcliffe	Hardin	Well #2, 280'	16562		2.1	Nil		
Logan	Harrison	Well #1A, 481'	16566	09-30-80	1.9	11		
Ackley	Hardin	Well #4, 110'	16571	10-29-80	1.7	8		
Ackley	Hardin	Well #5, 132'	16572	09-30-80	0.3	4		
Buffalo Center	Winnebago	Well #1, 500'	16594	10-16-80	1.3	4		
Buffalo Center	Winnebago	Well #2	16595	10-16-80	1.8	Nil		
Belle Plaine	Benton	Well #2	16597	10-20-80	2.6	Nil		
Swea City	Kossuth	Well #1, 471'	16602	10-21-80	0.9	5		
Indianola	Warren	Well #10, 2500'	16632	11-05-80	0.8	15		
Stuart	Adair	Well #2, 250'	16644	11-06-80	0.8	2		

Table 34

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
DEQ MINERAL SAMPLES

Data for December 1980

TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
Bancroft	Kossuth	Well #2	15669	12-05-79	5.9	3.0	2.0	
Clarion	Wright	Well #1	15672	12-06-79	5.4	1	5.9	
Lowden	Cedar	Well #1, 1500'	15683	12-11-79	3.2	14	3.9	
Fenton	Kossuth	Well #1, 229'	15688	12-12-79	4.8	1	2.1	
Deloit	Crawford	Well #4, 53'	15690	12-12-79	3.7	1	0.4	
Panama	Shelby	Well #2, 40'	15704	12-20-79	3.9	1	0.7	
Panama	Shelby	Well #4, 40'	15706	12-20-79	3.6	Nil	1.0	
Ledyard	Kossuth	Well #1	15715	12-27-79	4.7	2	2.0	
Wesley	Kossuth	Well #1, 1085'	15732	01-08-80	4.3	4	1.4	
Wesley	Kossuth	Well #2, 302'	15733	01-08-80	3.6	4	1.2	
Donahue	Scott	Well #1, 407'	15734	01-08-80	3.9	Nil	2.1	
Perry	Dallas	Composite-Well #11, 12, 13, 14, 15, 16, 17, 19	15737	01-07-80	9.2	13	3.6	
Lake Mill	Winnebago	Well #2, 425'	15741	01-10-80	3.3	3	2.6	
Magnolia	Harrison	Well #1, 235'	15743	01-10-80	11.1	5	<0.1	
Ringsted	Emmet	Well #4, raw	15764	01-14-80	7.3	3	2.5	

UNIVERSITY HYGIENIC LABORATORY
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DEQ MINERAL SAMPLES

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TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
Pleasantville	Marion	Well #1, 2405'	15778	01-17-80	8.8	12	7.1	
Dallas Melche	Marion	Well #1, 2500'	15780	01-17-80	5.1	13	3.7	
Independence	Buchanan	Well #MH1 East	15785	01-22-80	0.9	3		
Rockwell City	Calhoun	Well #5, 1965'	15797	01-22-80	10.0	22	4.8	
Lohrville	Calhoun	Well #3, 645'	15799	01-22-80	2.3	Nil		
Stanton	Montgomery	Well #2, 150'	15802	01-23-80	5.7	Nil	3.3	
Stanton	Montgomery	Well #1, 158'	15803	01-23-80	1.6	1		
Preston	Jackson	Well #1, 720'	15805	01-24-80	1.8	5		
Andrew	Jackson	Well #1, 250'	15806		1.2	5		
Lynneville	Jasper	Well #3	15817	01-29-80	9.5	Nil	1.7	
Clermont	Fayette	Well #2, 240'	15819	01-29-80	1.5	3		
Grafton	Worth	Well #2, 295'	15820	01-29-80	2.9	Nil		
Grafton	Worth	Well #1, 186'	15821	01-29-80	1.9	3		
Grinnell	Poweshiek	Well #8, Jordan	15825	01-31-80	9.1	12	5.1	
Sloan	Woodbury	Well #3, 97'	15826	01-30-80	3.4	9	0.95	
Springbrook	Jackson	Well #1, 1035'	15828	01-31-80	2.4	2		

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DEQ MINERAL SAMPLES

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TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
Baldwin	Jackson	Well #1, 160'	15829	01-31-80	2.1	4		
Hornick	Woodbury	Well #2	15830	01-30-80	1.2	3		
Williamsburg	Iowa	Well #5, 270'	15831	01-31-80	0.9	4		
Batavia	Jefferson	Well #1, 100'	15844	02-06-80	1.7	Nil		
Richland	Keokuk	Well #1, 1870'	15845	02-07-80	22.5	23	8.4	
Grandview	Louisa	Well, raw water	15857	02-12-80	1.5	Nil		
Goldfield	Wright	Well #1, 200'	15866	02-14-80	1.9	2		
Wellsburg	Grundy	Well #2	16184	05-08-80	6.6	9	1.2	
LaPorte City	Black Hawk	Well #3, 350'	16193	05-13-80	7.8	Nil	0.57	
Stratford	Hamilton	Well #2, 495'	16222	05-20-80	7.0	9	1.8	
Kanawha	Hancock	Well #2	16223	05-21-80	9.5	Nil	0.81	
Ricketts	Crawford	Well #1971-1, 37'	16224	05-20-80	7.5	14	1.1	
Stratford	Hamilton	Well #3, 550'	16231	05-22-80	3.1	5	1.4	
Dayton	Dallas	Well #2, 430' FEE Wayne Tell, Tell Well Co., Box 137, Dayton, IA 50530	15273	06-11-80	1.9	7		
Barnum	Webster	Well #1, 850'	16285	06-11-80	3.0	6	3.6	

Table 34 (continued)

UNIVERSITY HYGIENIC LABORATORY
IOWA CITY, IOWA
RADIOLOGICAL ANALYSIS
DEQ MINERAL SAMPLES
Data for December 1980

TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
Cherokee Co. Rural Water Assoc.	Cherokee	Well #C-2, 250'	16379	07-10-80	11	8	2.3	
Cherokee Co. Rural Water Assoc.	Cherokee	Well #MC-2, 379'	16380	07-10-80	3.6	4	0.36	
Kiron	Crawford	Well, 420'	16389	07-15-80	14	14	1.4	
Gladbrook	Tama	Well #6, 50'	16454	07-31-80	3.0	Nil	0.32	
Merrill	Plymouth	Well #3, 45'	16486	08-12-80	3.3	10	0.33	
Moorhead MWS	Monona	Well #2, 76'	16489	08-13-80	3.4	9	0.22	
Ackley	Hardin	Well #3, 140'	16515	09-03-80	3.6	Nil	0.35	
Sheldon	O'Brien	Well #3	16520	09-08-80	3.5	11	0.58	
Sheldon	O'Brien	Well #8, 33'	16521	09-08-80	14	7	0.42	
Webster	Keokuk	Well #1, 180'	16552	09-24-80	1.5	2		
Woodbine	Harrison	Well #3, 94' FEE Layne Western, 4430 Commercial Ave., Omaha	16595	10-06-80	3.3	10	<0.29	1.8
Clay Co. Rural Water System	Clay	Well #2, 42' FEE Nichols Well Service, R.R. #1, Box 281, Sioux City, IA 51108	16587		2.2	6	0.3	0.6

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DEQ MINERAL SAMPLES

Data for December 1980

TOWN	COUNTY	IDENTIFICATION	MINERAL #	DATE SAMPLED	pCi/l			
					ALPHA	BETA	^{226}Ra	^{228}Ra
Belle Plaine	Benton	Well #1	16598	10-20-80	0.3	Nil		
Mo. Valley MWS	Harrison	Well #3, 90'	16604	10-20-80	2.2	13		
Mt. Auburn	Benton	Well #2, 461' FEE Layne Western Co., Inc. Dean Heldt, 705 S. Duff, Ames, IA 50010	16635	11-05-80	1.9	Nil		
Mt. Auburn	Benton	Well FEE Layne-Western Co., Inc., Dean Heldt, 705 S. Duff, Ames, IA 50010	16636	11-05-80	1.6	Nil		

ENVIRONMENTAL RADIATION DATA (ERD) is published quarterly (January, April, July, October) by the Office of Radiation Programs, U.S. Environmental Protection Agency.

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